ENVIRONMENTAL ASSESSMENT

for the

DEER WILLY FUEL HAZARD REDUCTION PROJECT

EA# OR117-08-02

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT
GRANTS PASS RESOURCE AREA

July 2008

Dear Reader:

We appreciate your interest in the BLM's public land management activities. Public involvement for the Deer Willy Fuel Hazard Reduction Project began in May 2007 when approximately 132 scoping letters were sent to the public. The scoping letters were sent to residents and landowners near or adjacent to BLM parcels within the planning area, to federal, state, and county agencies, and to private organizations and individuals that requested information concerning projects of this type, inviting them to contact the BLM with information, comments and concerns. Personal discussions and comment letters provided public input to BLM for consideration in the EA. Open house meetings were held in June and July 2007, and February 2008.

A second scoping letter was sent to approximately 93 individuals, agencies and organizations that expressed an interest in continuing to be informed of the project. This letter outlined the draft proposed actions and was followed up with another public meeting in February 2008 and a public field trip in March 2008. All public input was considered by the planning and interdisciplinary teams in developing the proposals and in preparation of this EA.

We appreciate your taking the time to review this environmental assessment (EA). If you would like to provide us with written comments regarding this project or EA, please send them to me at 2164 NE Spalding Avenue, Grants Pass, OR 97526.

If confidentiality is of concern to you, please be aware that comments, including names and addresses of respondents, will be available for public review or may be held in a file available for public inspection and review. Individual respondents may request confidentiality. If you wish to withhold your name and address from public review or from disclosure under the Freedom of Information Act, you must state this clearly at the beginning of your written comment. Such requests would be honored to the extent allowed by law. All submissions from organizations or officials of organizations or businesses will be made available for public inspection in their entirety.

I look forward to your continued interest in the management of our public lands.

Abbie Jossie
Field Manager
Grants Pass Resource Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MEDFORD DISTRICT

EA COVER SHEET

RESOURCE AREA: *Grants Pass Resource Area* EA # OR-117-08-02

ACTION/TITLE: *Deer Willy Fuel Hazard Reduction Project*

LOCATION:

Township	Range	Sections
38S	5 W	5, 7, 8, 9, 17, 18, 19, 20, 21, 29, 30, 31
38S	6 W	13, 22, 23, 24, 25, 26, 27, 34, 35
39S	5 W	19, 30, 31,
39S	6 W	1, 3, 11, 12, 13, 14, 15, 23, 24, 25, 26

*Willamette Meridian, Josephine County, Oregon

FOR FURTHER INFORMATION CONTACT: Abbie Jossie
Grants Pass Interagency Office
2164 NE Spalding Ave., Grants Pass, OR
97504 (541) 471-6500

Interdisciplinary Preparers	Title	Resource Values	
Allen Mitchell	Fire Mitigation Specialist	Fire and Fuels, Project Lead	
Cori Francis	Forester	Vegetation	
Jon Raybourn	Fisheries Biologist	Fisheries	
Jeanne Klein	Outdoor Recreation Planner	Recreation and Visual Resources	
Lisa Brennan	Archaeologist	Cultural Resources	
Mike DeBlasi	Hydrologist	Hydrology, Soils, EA compilation	
Robin Taylor	Botanist	Special Status Plants	
Jim Roper	Engineer	Roads and Easements	
Jason Reilly	Wildlife Biologist	Wildlife	
Bob Murray	Forester	Harvest Systems	
Anthony Kerwin	Environmental Coordinator	NEPA	

Contents

CHAPTER 1: PURPOSE AND NEED FOR THE PROPOSED ACTION

1.0 Introduction

The Bureau of Land Management (BLM), Grants Pass Resource Area, proposes the Deer Willy Fuel Hazard Reduction Project in the Williams and Deer Creek Watersheds. This project is one of many that implement the Bureau of Land Management's Medford District Record of Decision and Resource Management Plan (RMP) (USDI 1995) for these watersheds. Management direction set forth in the RMP provides direction for resource management on BLM-administered lands according to various land use allocations. The Resource Management Plan was developed, and overall effects of its implementation were analyzed and disclosed in the Medford District Proposed Resource Management Plan/Environmental Impact Statement (RMP/EIS) (USDI 1994). This Environmental Assessment (EA) analyzes the site-specific effects of implementing the Deer Willy Fuel Hazard Reduction Project (from here on referred to as the Deer Willy FHRP) to determine whether effects will be within those already analyzed in the RMP/EIS.

This chapter of the EA describes the needs, goals and objectives (purpose and need) for the project area. The project area is the area where land management actions are proposed, and represents the area of consideration for assessing current and desired forest, vegetation, fire hazard and risk, and transportation system conditions related to the goals and objectives outlined in BLM's Medford District RMP. This chapter also defines the project area and sets the context for development of the action alternatives and analysis of environmental effects of the alternatives.

This document is designed under the auspices of the Healthy Forest Initiative (HFI) and the Healthy Forest Restoration Act (HFRA) and complies with the Council on Environmental Quality's (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA; 40 CFR Parts 1500-1508) and the Department of the Interior's manual guidance on the National Environmental Policy Act of 1969 (516 DM 1-7).

1.1 What is BLM proposing and where?

This section provides a summary of BLM's proposal for landscape management. A more detailed description of alternatives is included in Chapter 2. The proposed Deer Willy FHRP is located within the 51,971 acre Williams Creek 5th field Watershed and a portion (1,843 acres) within the 72,679 Deer Creek 5th field watershed and within the Applegate Adaptive Management Area (AMA). Lands within the Deer Willy FHR project area are a "checker board" of federal, private, county and state ownership. Approximately 17,207 acres are BLM-administered Late Successional Reserve; 7,892 acres are US Forest Service land; and an estimated 3,460 acres are privately/county owned. The legal description for the project area is shown in Table 1.

Table 1. Legal description* of Deer Willy project area

Township	Range	Sections
38S	5 W	5, 7, 8, 9, 17, 18, 19, 20, 21, 29, 30, 31
38S	6 W	13, 22, 23, 24, 25, 26, 27, 34, 35
39S	5 W	19, 30, 31,
39S	6 W	1, 3, 11, 12, 13, 14, 15, 23, 24, 25, 26

*Willamette Meridian, Josephine County, Oregon

The Deer Willy FHRP proposes to thin vegetation within 200' of roads located in the Deer Williams LSR for fuel hazard reduction and the development of strategic fuel modification zones (FMZ) along strategic ridges. Fuel hazard reduction may be extended further than 200' from roads where it is reasonable to extend to the top of strategic ridge systems. Along with thinning treatments, Port-Orford Cedar (POC) sanitation treatments would occur within 50' of roads in the Deer Williams LSR in areas that have a significant component of POC that are currently infected or at risk for infection. Management of the roads in the Deer Williams LSR is also included in the project proposal. Road management would include road maintenance, restoration and closures. The final component of the proposed action is noxious weed treatment in the project area.

Two alternatives are considered and analyzed in detail, a No-Action Alternative and one action alternative.

1.2 Why is BLM proposing the Deer Willy Fire Hazard Reduction Project?

The Deer Willy FHRP is designed to comply with the Healthy Forest Restoration Act of 2003 (Bill H.R. 1904), National Fire Plan (Public Law 106-291), and the Ten-year Comprehensive Strategy Implementation Plan to reduce fire hazard in forests of the western United States, and to implement Medford District's 1995 RMP in the Deer Willy FHRP area. This project proposal is designed to move the current conditions found on the Deer Willy project area toward the desired forest stand conditions and to attain management objectives identified for lands assigned to the Applegate Adaptive Management Area (AMA), Late Successional Reserves (LSR) within the AMA, and Riparian Reserve land allocations.

The primary objective identified for lands in the project area is the need for fuel hazard reduction and to create strategic areas for fire suppression activities.

There is a need to reduce hazardous fuels and create strategic areas along roads and ridges for fire suppression activities.

Fire, both in its historic frequency, and then in its relative absence over the past 100 years, has been the primary natural disturbance process and an essential ecological process that shaped the existing vegetation conditions and seral stage distribution across the project area today. The project area has missed 2-5 fire cycles in the last 100 years (see Chapter 3, Fire & Fuels, Affected Environment).

As a result of the absence of fire, there is a build-up of fuels and a change to more dangerous fire-prone vegetative conditions, especially in the lower to mid-elevations within the planning area. Shade tolerant and less fire resistant species have become established, replacing more fire adapted species such as ponderosa pine, which are decreasing due to suppression of fire. The

probability of a stand replacement crown fire is much higher now than a hundred years ago due to the increased surface and ladder fuels resulting from missed fire cycles. Both BLM-managed resources and rural residential areas are threatened by an unacceptably high potential for stand replacing wildfires.

RMP direction for the Applegate AMA says to "[u]se accepted wildfire suppression strategies and tactics, and conform to specific agency policy" (RMP, p. 37). Federal agencies are still directed to suppress all wildland fires except in areas where a fire management plan is developed to allow natural fires to burn under specific atmospheric conditions and forest fuel conditions. These areas are generally in large, uninhabited tracts of land such as wilderness areas.

Large tracts of BLM managed lands within the project area have inadequate or no access for wildfire suppression or fuels hazard reduction treatments and maintenance. Heavy fuel loadings along travel routes, overgrown seasonal roads or areas surrounded by private lands with no easements hinder safe ingress for wildland fire suppression resources to key strategic areas; egress for private citizens along evacuation routes is also much more hazardous. Hazardous fuels reduction treatments are needed to reduce the intensities of wildfire and improve firefighter safety and access for suppression efforts in the Deer Willy FHR project area.

Objectives for reducing hazardous fuels

Decrease the likelihood of high intensity fire behavior which can damage natural resources and homes and threaten the safety of individuals and firefighters by:

- Reducing fuel hazards along BLM-administered roads and strategic ridges, creating a network of fuel breaks and/or safe access to areas to fight fires from.

Within Late-successional and Riparian Reserves in the AMA:

- Develop / promote late-successional habitats (mature and old-growth forests) through silvicultural prescriptions in stands less than 80 years of age.
- Reduce the risk for the loss of late-successional habitats from stand-replacing fire.

Objectives for creating strategic areas for fire suppression activities:

- Create a network of strategic areas with reduced fuels along roads and ridges, fuel modification zones (FMZ), to improve fire suppression capabilities.
- Identify all private and public road systems that would provide for ingress and egress for wildland fire fighting resources and public in the event of natural disasters such as wildland fire or floods.
- Improve access to provide anchor points, and safe ingress and egress for the public and firefighters.
- Plan and implement a long term treatment plan to maintain these roads.
- Locate and maintain sites where water is pumped to suppress fires (RMP, p. 90).

Secondary benefits of the project will include:

1. An opportunity to reduce the risk of spread of Port-Orford Cedar root disease
2. Enhancement of local economies through project funding and forest product availability (e.g., firewood, biomass, poles, sawlogs)

3. An opportunity for collaboration and positive relationship building with the local community
4. Eradication and/or control of noxious weed populations along roads

1. Port-Orford Cedar

Port-Orford Cedar (POC) in the project area, generally found on low elevation / moist sites, is susceptible to infection by a fatal exotic root pathogen *(Phythophthora lateralis)*. Research on this pathogen indicates that spread occurs downstream in water and when vectors (e.g., vehicles, individuals, animals) carry infected soil offsite. Therefore, sites at a high-risk for additional spread are those along infected streams and along road systems which have POC trees. There are no uninfected 7th field watersheds found within the project area. Given the following concerns in the project area, there is an opportunity to reduce the potential for infected soil transport along project roads:

- Unauthorized OHV use has the potential to spread current infections to other areas.
- Evidence of past illegal bough collecting poses a threat to other areas.
- Past efforts to limit access by gating roads has been ineffective in many areas.

Objectives for control of Port-Orford cedar root disease

The general direction for POC management is to implement an integrated management approach that retains POC on sites at low risk for infection (POC ROD p. 30) while also implementing strategies to reduce spread potential in high risk sites. To be consistent with the POC ROD the objective for POC management in the project area is to reduce spore loading of POC root disease where human vectors have the most potential to spread the disease offsite (e.g., along roads) (POC ROD pp. 35-37).

2. Enhancement of local economies

Vegetative treatments to reduce hazardous fuels on BLM lands potentially provide forest byproducts, such as small diameter poles, which are typically utilized in the production of wood based products such as flooring, molding, firewood, fencing materials and other specialized wood products. Additionally, the remaining biomass materials produced by the hazardous fuels reduction may be processed as a renewable energy source.

The Deer Willy FHRP proposal will make these products available to local area contractors and small business through the use of creative Stewardship contracts and small diameter pole sales. Through these contracts and sales, economic benefits to the small businesses and contractors located within the project area communities will be realized.

Objectives for enhancement of local communities

Educate the communities on the prospective business and contracting opportunities regarding fuels reduction byproducts

- Plan and implement small diameter sales and stewardship contracts
- Initiate collaborative efforts to increase community capacity for production, extraction, and utilization of small diameter and biomass products
- Reduce the number of burn days and particulate emissions

3. Collaboration and relationship building with the local community
Objectives

- Develop a monitoring plan in the project area to promote learning and adaptive management to improve future project development and implementation
- Monitoring will focus on select data gaps in forest ecological systems (RMP p. 37).
    - Develop a positive collaborative framework with the community for implementation of this proposed project by providing public informational meetings and informal educational sessions with community members.

4. Control of noxious weeds

Noxious weeds are non-native aggressive plants brought to North America either accidentally or intentionally. These species out-compete our native species for water, nutrients, and light which in turn crowds out and reduces populations of native species. Noxious weeds degrade recreation areas, increase fire risk, reduce forest health, decrease habitat for wildlife, invade croplands/pastures, and decrease availability of livestock forage. Certain species are potentially toxic to humans and other animals. Due to these reasons there is a need to treat noxious weeds along roadways to reduce the spread to other areas within the project area and to neighboring lands. Seeds can remain viable for many years and they have extensive root systems which can re-sprout even after the tops of plants have been removed making it critical to use early detection and rapid response. By detecting noxious weed sites early and rapidly treating them, this decreases the chance for new populations establishing and increases the chance to eradicate noxious weed species out of the area. Noxious weeds have no natural predators at the infestation site since their native habitat is outside the U.S. which makes it very difficult to control these species. Noxious weeds are primarily found in disturbed areas often along roads and trails.

Noxious weeds are non-native aggressive plants brought to North America either accidentally or intentionally. These species out-compete our native species for water, nutrients, and light which in turn crowds out and reduces populations of native species. Noxious weeds degrade recreation areas, increase fire risk, reduce forest health, decrease habitat for wildlife, invade croplands / pastures, and decrease availability of livestock forage. Certain species are potentially toxic to humans and other animals. Due to these reasons there is a need to treat noxious weeds along roadways to reduce the spread to other areas within the project area and neighboring lands. Seeds can remain viable for many years and they have extensive root systems which can re-sprout even after the tops of plants have been removed making it critical to use early detection and rapid response. By detecting noxious weed sites early and rapidly treating them, this decreases the chance for new populations establishing and increases the chance to eradicate noxious weed species out of the area. Noxious weeds have no natural predators at the infestation site since their native habitat is outside the U.S. which makes it very difficult to control these species. Noxious weeds are primarily found in disturbed areas often along roads and trails.

Objectives for control of noxious weeds:

Reduce, control, contain, or eradicate noxious weed infestations on BLM-administered land using an Integrated Pest Management (IPM) process (RMP, p. 92). Noxious weed populations will be treated using IPM techniques based on the species, habitat, and environmental factors under the direction of the Medford District Integrated Weed Management Plan (PA-OR110-98-14). The goal of IPM will be to maintain or develop ecologically healthy plant communities that

are relatively weed resistant, while meeting other land-use objectives such as forage production, wildlife habitat development, native plant diversity, recreational land maintenance, and high intensity resistant area.

1.3 Decision Factors

This Environmental Assessment will provide the information needed for the authorized officer, the Grants Pass Resource Area Field Manager, to render a decision regarding the selection of a course of action to be implemented for the Deer Willy FHRP. The Field Manager must decide whether to implement the Alternative as proposed, select the no-action alternative, or modify the action alternative to best meet objectives of the project.

The decision will also include a determination whether or not the impacts of the proposed action are significant to the human environment. If the impacts are determined to be within those impacts analyzed in the Medford District Resource Management Plan/EIS (USDI 1995) and the Northwest Forest Plan (USDA/USDI 1994), or otherwise determined to be insignificant, a Finding of No Significant Impact (FONSI) can be issued and a decision implemented. If we determine in the process of preparing this EA that the significance of impacts are likely greater than those previously analyzed and disclosed in the RMP/EIS and the NWFP SEIS, then a project specific EIS will be prepared instead.

1.4 Conformance with Land Use Plans and Other Documents

The actions proposed and analyzed in this EA were developed to be consistent with the management objectives for public lands identified in the following documents:

1. Final EIS and ROD for the Medford District Resource Management Plan (RMP) (1995)
2. Final Supplemental EIS on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (1994)
3. ROD for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and its attachment A entitled the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl (NWFP) (1994)
4. Final SEIS for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2000), and the ROD and Standards and Guidelines for Amendment to the Survey & Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001)
5. Medford District Noxious Weed Environmental Assessment (1998).
6. ROD for Management of Port-Orford Cedar in Southwest Oregon (2004)

In addition to the documents cited above, project planning drew from information and recommendations from the following:

1. Medford District BLM Biological Assessment (2007) and USFWS Letter of Concurrence (Log #1-15-06-I-165) (September 28, 2007)
2. Visual Resource Contrast Rating BLM Manual Handbook 8431-1
3. BLM Manual 6840 – Special Status Species Management (2001)
4. National Fire Plan (NFP) (2000)

5. National Fire Plan 10-year Comprehensive Strategy and Implementation Plan (2002)
6. Josephine County Integrated Fire Plan (2004)
7. Applegate Fire Plan 2002
8. U.S. Department of Interior, Bureau of Land Management, Western Oregon Districts, Transportation Management Plan (1996, updated 2002)
9. Southwest Oregon Interagency Biomass Utilization Strategy (Draft, November 2006)

Since the inception of the Applegate AMA in 1994, several guides and other documents specific to the AMA have been produced. These are not decision documents. The following provides a brief description of the topics covered in each of these documents:

A. Watershed Analysis
Watershed Analysis is a procedure used to characterize conditions, processes, and functions related to human, aquatic, riparian and terrestrial features within a watershed. Watershed analysis is not a decision making process. They establish the context for subsequent planning, project development, regulatory compliance and agency decisions (Federal Guide for Watershed Analysis 1995 p. 1).

The Deer Willy FHR project area falls primarily within the Williams Creek 5th field watershed, which is covered by the Williams Creek Watershed Analysis (USDI 1996). A small portion of the project area is within the Deer Creek 5th field watershed, which is covered by the Deer Creek Watershed Analysis (USDI 1997).

B. Applegate Adaptive Management Area (AMA) Ecosystem Health Assessment (USDA/USDI 1994)
An increase in dead and dying forest trees in southwest Oregon prompted land managers from the Bureau of Land Management and Forest Service to appoint an interagency group to conduct an ecological assessment of the Applegate Sub-basin. The assessment was based on existing information and addressed primarily the terrestrial components of the ecosystem. Stand level recommendations for the attainment of forest health and fuels reduction are included in the Ecosystem Health Assessment (p. 64-68, and 70).

C. Applegate Communities' Collaborative Fire Protection Strategy (2002 Applegate Fire Plan)
The Applegate Fire Plan is the result of a collaborative effort between local citizens and local and federal agencies to develop a strategy for addressing fire protection and suppression, fuel hazard reduction, and emergency communications throughout the Applegate Valley.

The Applegate Fire Plan developed recommendations for nineteen strategic planning areas across the Applegate Watershed. Recommendations for the Strategic Planning Areas within the Deer Willy FHR project area include addressing hazardous fuels on BLM lands between Murphy and Lower Williams, at the base of Cheney Creek, along Fish Hatchery Road and along the Community at Risk boundary to protect the LSR.

D. Applegate River Watershed Assessment: Aquatic, Wildlife, and Special Plant Habitat (USDI/USDA 1995): The Applegate River Watershed Assessment provides an overview of conditions and trends related to aquatic, wildlife, and special plant habitats in the Applegate Watershed. The assessment includes recommendations for maintaining these habitats over the long-term.

E. Applegate Adaptive Management Area (AMA) Guide (USDI/USDA 1998)
The Applegate AMA Guide was developed as a working document outlining how agencies expect to do business in the Applegate Watershed for the next several years. Key questions and strategies are outlined

in the AMA Guide providing an overview of the physical, biological and social setting of the Applegate Watershed and include key questions and strategies or approaches for management.

1.5 Issues and Concerns

A variety of issues and concerns were raised during project scoping by BLM's interdisciplinary team, and interested individuals and groups outside the BLM. In this EA an issue is something unique to the project area that may need particular consideration and which may contribute to defining a particular action alternative. In some cases, an issue was initially considered by the planning team and then eliminated from further analysis because it was not within the scope of the project or was determined to be irrelevant to making a decision on the project. These are summarized in Appendix D.

In addition to the objectives additional issues pertinent to the analysis are:

- T&E species: project activities may remove or degrade habitat for T&E species
- Access for fire suppression
- Smoke impacts to residents from prescribed fire
- Lack of large hardwoods due to past spraying and shading/competition
- Natural surface roads contributing sediment to streams
- Continuation of garbage dumping on BLM lands
- Ground disturbing activities may increase soil erosion and compaction, potentially reducing soil productivity and increasing stream sedimentation.
- Effect to residents from log truck traffic and chainsaw noise
- Changes to viewshed as a result of vegetation management or road projects

2.0 PROPOSED ACTION FOR EACH ALTERNATIVE

2.1 Alternative 1: The No Action Alternative

The "No Action" alternative is defined as not implementing any aspect of the action alternatives. The no action alternative also serves as a baseline or reference point for evaluating the environmental effects of the action alternatives. Inclusion of this alternative is done without regard to the decision made in the Medford District RMP and without regard to meeting the purpose and need for the project.

The No Action alternative is not a "static" alternative. Under the No Action alternative, the present environmental conditions and trends will continue. This would include trends such as vegetation succession and consequent terrestrial and aquatic habitat changes, increases in fire hazard, continued road condition or deterioration, and continued or increasing rates of erosion, as well as current road densities and various unregulated uses (i.e. OHV use, equestrian use, wood theft, illegal dumping), etc. The effects of other present and reasonably foreseeable future actions that are not dependent on any of the action alternatives are included in the effects analysis for this alternative.

2.2 Alternative 2: Action Alternative

2.2.1 Fuel Hazard Reduction

Fuel treatments proposed in the action alternative (Appendix A, Maps and Appendix B, Treatment Tables) reflects our estimation of what will be required on the project area regarding fuel hazard reduction.

Approximately 4,571 acres of strategic roadside (within 200 feet of roads) and ridgeline treatments encompassing natural fuels in the WUI would be treated under this action alternative. Treatments would include a mix of thinning, slashing, biomass removal, underburning and handpile burning, depending on site specific conditions. Two levels of fuel hazard reduction intensity have been determined to achieve objectives identified in chapter 1. The primary difference between the levels is the age of the stand and the corresponding thinning prescription. More aggressive spacing of the young stands in the level 2 areas would reduce competition between leave trees and increase tree vigor. Well spaced larger trees would help promote late successional characteristics.

Fuel Hazard Reduction Level 1 – Selectively thin conifer trees less than 12 inch DBH and hardwoods less than 8 inch DBH on approximately 3,694 acres in strategic areas (roadsides and ridgelines). This would occur in older forest stands and leave understory trees spaced 20 to 25 feet apart (70 to 100 trees/acre). The most vigorous conifers and hardwoods would be left on a grid spacing that will ignore the density of trees >12" dbh.

Fuel Hazard Reduction Level 2 – In stands less than 80 years of age. Selectively thin trees less than 20 inch DBH on approximately 877 acres to achieve 50% canopy retention. This would occur in plantations / young stands (<80 years old) and would leave the largest trees to achieve an average canopy closure of 50% or greater. Where opportunities exist, large non-tanoak hardwood would be the preferred leave species.

Biomass may be removed during initial fuel hazard reduction. Approximately 3,386 acres of ground based extraction and 645 acres of cable based extraction are proposed in all vegetation treatments (i.e. commercial, non-commercial, riparian and LSR). Actual acres treated will likely be less due to economic, safety and access limitations. The purpose of these prescribed treatments is to reduce hazardous fuels, reduce smoke emissions and utilize the biomass to benefit the local economy. In areas where biomass extraction is not feasible, hand piling and burning would occur. Ground based methods would utilize existing skid trails whenever possible. When this is not possible, we will require the designation of skids trails, spaced approximately 75 feet apart.

Proposed Action

Initial fuel reduction: Understory vegetation would be thinned using manual and mechanical techniques (slashing, pruning) to the desired tree densities and stocking levels.

Oak woodland restoration – In stands where oak have been encroached on by conifers. All conifers <12" DBH within 75 ft. radius of larger oak (over 12" DBH) would be removed.

Biomass removal: Biomass is any dead or living vegetation in a fuels unit that is ≤12" in diameter for conifers and ≤8" for hardwoods. For slopes <35%, mechanized low ground pressure machinery would cut, skid, haul or chip biomass. On slopes >35%, biomass would be cable yarded.

Slashing (SL) Understory vegetation density would be reduced by cutting and spacing of conifers <12" dbh and hardwoods <8" dbh. Retained vegetation would be spaced 20 – 25 feet apart. Within this range, wider spacing would be used for larger leave trees or for species such as pine or oak which thrive in less dense conditions. Vegetation diversity would be obtained by maintaining species occurring at low frequencies in the stand (i.e. Pacific yew, pine, vine maple). Untreated vegetation groups ranging in size from 0.1 to 2 acres would be retained in each treatment unit.

Hand piling and burning (HP) is typically used when underburning is not possible due to heavy fuel loads. Woody material 1-7" in diameter and longer than 2 feet would be piled by hand. The piles would be covered with plastic to create a dry ignition point and would be burned during the wet season when the risk of fire spread (scorch or mortality) to nearby residual trees and shrubs is minimized.

Understory Burning (underburning) (UB) is used where the objective is to maintain ≥80% of the overstory. The objective is to reduce dead and down woody material, shrubs and small trees in the understory, and live and dead branches close to the ground. Underburning is conducted throughout the year when fuel and weather conditions permit. Periodic, low intensity underburns following initial fuel reduction would maintain desired fuel conditions. Maintenance burning throughout the project area would need to be done about every 7-15 years in areas classified as fire regime 1 and every 10-30 years for areas in fire regime 3.

2.2.2 Road and Systems Management

The objective is to stabilize permanent roads, improve road drainage and maintain existing roads at levels consistent with the planned long term use of the roads.

The proposed road work is intended to improve road drainage to decrease the potential over the long term for sediment to reach streams. The proposal also establishes designated fire breaks and escape routes between watersheds, and establishes long term resource management objectives.

Proposed Action

Roads treated would be those used to implement the proposed actions. Proposed road maintenance and renovation is outlined in Appendix C. No road construction or decommissioning is proposed.

Approximately 173.5 miles of existing road would be maintained to reduce erosion and sediment deposits into streams. Road drainage would be improved, and deteriorated surfacing would be replaced. Additional drainage structures would be installed on existing roads to improve drainage. Approximately 30 miles of road in the project area would be managed as designated

fire break roads and 25 miles of road will be designated as escape routes. Thirteen water sources (pump chances) on established roads will be managed as permanent sources for fire suppression.

Hazard trees (dead and dying trees that lean toward the road and are sufficiently tall to reach the roadbed) would be felled and may be removed through the small sales program. Hazard trees in the riparian reserve may be felled and left in place for large woody debris.

Roads that channel water resulting in erosion and sediment transport to streams will be improved to provide better drainage (e.g., culvert work, ditch clearing, rocking, construction of drainage dips, etc.) as part of this alternative. Specific proposed road work (maintenance, renovation, construction, etc.) is listed in Appendix C.

There are approximately 173.5 miles of BLM roads in the project area. The roads table (Appendix C) includes proposals for maintenance and renovation. Three new gates would be installed on roads 39- 06-13.00A and, 38-05-05.01

2.2.3 Port-Orford Cedar (POC)

As stated in chapter 1, the objective for POC management in the project area is to reduce spore loading of *Phythophthora lateralis* where human vectors have the most potential to spread the disease offsite (e.g., along roads). To limit the spread of POC root disease, roadside sanitation and gate management are two strategies which integrate well with the need to reduce hazardous fuels and provide access points for fire suppression activities.

Proposed Action

Roadside Sanitation: all POC trees less than 20" dbh would be eliminated from a buffer zone of up to 50 feet on either side of identified roads in the project area (see maps, Appendix A). The relative amount of POC within this buffer zone is generally less than 10% of the total tree cover, with a highly variable pattern of establishment. The buffer zone could be smaller than the 50 feet on either side of the road if the tree distribution and topographic position is such that the risk of spread from human vectors is minimal. POC boles and boughs in excess of those needed to meet snags and down wood targets would be available to be sold as special forest products. Unit scheduling would include a phase of removing POC trees within the buffer zone first, washing tools, equipment, and boots after this removal, and then doing the rest of the thinning outside the buffer zone with clean equipment. This would insure non-infected POC trees located away from the roads would not be infected during the project implementation phase. Live POC trees outside the buffer zone would be reserved from cutting.

Gate management: most of the lateral roads in the project area currently have gates that were installed in the 1990's to protect against the spread of POC root disease. Each gate would be evaluated on a site specific basis as to whether the current design has effectively closed the area. If a gate is found to be ineffective as designed, new design features on each gate would be implemented by the contractor and/or by BLM engineers to better meet the purpose and need for each gate. Signs informing the public of the need for the gate will also be installed on each gate.

Protection of genetic diversity: the Williams Creek 5th field watershed has been the most intensively sampled watershed to date for identifying natural POC that show resistance to

Phythophthora lateralis (Personal communication F. Betlejewski March 2, 2008). The genetic material from these trees is currently being propagated by the Dorena Genetic Resource Center. Individual trees that are flagged and tagged as being resistant will be reserved from cutting. There are three outplanting sites in the project area that will also be reserved from treatment by flagging a no treatment buffer within 100 ft. of planted seedlings. In the interest of protecting these sites from vandalism, only internal BLM personnel will have knowledge of these sites.

Monitoring: The removal of Port-Orford Cedar along roads will be monitored using bait trees planted at specific intervals from the road edge in a manner similar to a study conducted by Marshall and Goheen (2003) on roadside sanitation treatments in Southwest Oregon. This study found an overall decrease in infected bait trees in all sanitized sites, with the most significant decrease in the first three years following treatment. The land use allocation of Adaptive Management Reserve, promotes "learning and adapting;" this project will help to better understand the effects of this treatment. The expected effects of decreased *Phytophthora lateralis* from high-risk sites are reduced POC infection in and outside the project area because there would be less potential for transport.

2.2.4 Noxious Weeds

Noxious weeds would be treated using an integrated pest management approach (RMP p. 92). Integrated Pest Management is a process that balances the use of many methods that are environmentally compatible and economically feasible to reduce populations of pest species to tolerable levels. This process integrates pest biology and control, environmental impacts, and economic costs and benefits. This process has several phases: 1) Education, inventory, and impact assessment. 2) Prioritizing weed problems and choosing and strategically implementing management techniques for a particular area of land. 3) Evaluating the management approach and techniques and making adjustments to optimize the Integrated Pest Management process. The only way we will be able to successfully address our weed problems is in an integrated approach, using all of the techniques and tactics available to us.

Proposed Action

The proposed treatment would reduce, control, contain, or eradicate species on BLM lands using the Oregon Department of Agriculture's State Noxious Weed List as a guide to determine species that should be treated. Populations of noxious weeds would be contained using the Integrated Pest Management process based on the species and the conditions in accord with the criteria established under the Medford District Integrated Weed Management Plan (PA-OR110-98-14). Noxious weed sites would be treated prior to and following ground disturbing activity in the area contingent on funding availability. All treated noxious weed populations would be monitored for treatment effectiveness, identification of newly established populations, and the need for further treatment.

2.3 Project Design Features

Project design features (PDFs) are included in the proposed actions for the purpose of reducing anticipated adverse environmental impacts which might otherwise stem from project implementation. The PDFs noted below would be integral to all activities unless otherwise noted.

2.3.1 Logging Systems

Whole tree yarding would be permitted as long as contractor can operate without causing unacceptable damage from bark slippage, girdling, broken tops, or damage to live crowns. If it is determined by the Authorized Officer that unacceptable amounts of damage is occurring, trees would be required to be bucked and limbed as directed by the Authorized Officer. Unacceptable would be mineral soil exposure greater than 25% and displacement greater than 10% of total area.

Any yarding corridor that has sufficient soil displacement to result in the collection or routing of surface, or subsurface runoff, would be rehabilitated by installing waterbars, re-contouring displaced soils that are adjacent to corridors, and applying mulch or fine slash to cover exposed soil as necessary to minimize erosion. Install waterbars in accordance with RMP standards and guides (RMP, p. 167). Any continuous areas of exposed mineral soil in excess of 10 liner feet within yarding corridors would be also rehabilitated using any combination of the above techniques as necessary to minimize erosion.

All natural surface landings constructed during the logging operation would be decompacted to a minimum depth of 18" and seeded/mulched with native grass seed and native or weed free straw upon completion of harvest and before the onset of the rainy season. Landings that would be used in the future would not be decompacted.

In riparian reserves, trees would be directionally felled toward approved skid roads. Riparian skid road construction would not occur within 75 feet of intermittent or within 100 feet of perennial streams. Priority for skid road selection would be those that have not recovered from previous use. Site restoration treatments would be applied after yarding has been completed and would include such activities as ripping / decompaction, water barring, seeding, tree planting and/or blocking as needed.

Where unstable and potentially unstable areas are found within riparian reserves, no log harvesting equipment and no harvesting of logs will be allowed.

Tractor Yarding

To reduce ground disturbance and soil compaction, yarding tractors would be limited to the smallest size necessary. Tractors would utilize one end log suspension during skidding and would be restricted to approved skid trails. Existing skid trails would be used whenever possible. Tractors would be restricted to slopes <35%. Tractors would not be used when soil moisture content exceeds 25% by weight at a 4-6" depth.

Skid roads would be water barred as needed for slope and soil type. Main tractor skid trails would be blocked where they intersect haul roads and would be decompacted or water barred shortly after yarding is completed to reduce erosion. Skid roads would be used only during the dry season. Within units, no more than 12% of the ground would remain compacted following biomass removal. Following biomass removal and prior to October 15th, pre-existing or newly created skid trails would be discontinuously subsoiled, seeded, water-barred, mulched, and blocked. If a skid road in a riparian reserve is used for more than one season it would be winterized (water barred, covered with debris, etc.). Interrupted subsoiling of new skid trails

may be authorized where the Authorized Officer determines that subsoiling skid trails would cause unacceptable damage to the root systems of residual trees along the majority of the skid trail.

For all subsoiling, winged ripper teeth would be used to subsoil the entire width of the skid trail, with rips no more than 36 inches apart, to a depth of 18 inches or to bedrock, whichever is shallower. Designated skid roads would be ripped. Water bars would be installed at the same time as subsoiling. Subsoiling of pre-existing skid trails may be waived when skid trails have sufficient vegetative growth to indicate that natural de-compaction is in an advanced state. Equipment would accomplish these requirements in a single pass to avoid driving back over subsoiled areas. In areas proposed for planting, ripped skid roads would also be planted. Other areas would be allowed to revegetate naturally.

Landings

All landings, including fill slopes, would be located away from headwalls, draw bottoms and adjacent draw side slopes. Existing stable roads and landings in riparian reserves would be reused to minimize new road or landing construction. All natural surface landings constructed during the logging operation would be decompacted after use except landings on rocky ground or those planned for future use. Landings would be seeded with native grasses, mulched with native, weed free straw, treated for effective drainage, or covered with slash following harvest and before the onset of the rainy season.

2.3.2 Seasonal Operating Restrictions

Table 2. Seasonal Operating Restrictions

Location	Restricted Activities	Restricted Dates	Reasons / Comments
Entire project area	All logging and log hauling operations	Oct. 15 to May 15*	Erosion control. Dates may vary depending on weather, road surface, drainage, and soil moisture.
Entire sale area – ¼ to ½ mile around any raptor nest	All timber harvest activities, road construction and chainsaw operation.	Variable depending on the species	Timber Sale E-4 Special Provision
1/4 mile radius around active spotted owl nest sites.	All timber harvest activities, road construction, chainsaw operation and prescribed burning	March 1 to June 30 (variable depending on nesting status)	Medford District BLM Biological Assessment (2007) and USFWS Letter of Concurrence (Log #1-15-06-I-165) (September 28, 2007)

Table 2. Seasonal Operating Restrictions			
Location	**Restricted Activities**	**Restricted Dates**	**Reasons / Comments**
¼ mile no line of site and ½ mile line of site around active bald eagle nest sites	All timber harvest activities, road construction, chainsaw operation and prescribed burning	Variable - January 1 to August 15	Dates and restrictions depend on nest activity. Rogue River/South Coast FY04-08 Timber Sale Projects Biological Assessment and USFWS Biological Opinion (#1-15-03-F-511, 2003).
All harvest units and road construction ROWs.	Various activities depending on the species	Variable depending on the species	Restrictions only if special status species are located. (RMP; BLM 6840 Manual)
Entire project area	Fuel hazard reduction	Variable	Time fuel reduction treatments to reduce conditions that contribute to bark beetles in logging slash.
* An additional consideration would be made for continued road use and helicopter logging after rain events from October 15 to May 15 on some roads. Continued use would require that roads are well drained and have adequate surface stability (such as BST, crushed rock, grid roll rock, or pit run rock). The BLM would monitor road conditions during hauling, and road maintenance would be kept current with hauling. Roads would be closed and weatherized if weather conditions change and hauling is suspended.			

2.3.3 Hauling

The BLM and DEQ have signed a Memorandum of Agreement which holds the BLM responsible to manage agency lands to protect, restore, and maintain water quality. This includes proper construction, maintenance and management of the road system as part of land management projects.

All new permanent and re-opened roads that are not designated for wet weather haul would have adequate surfacing or would be blocked and stabilized in such a way that no maintenance would be necessary to minimize erosion and road damage. Selected erosion prevention and sediment control measures would be implemented prior to the wet season (generally Oct 15th). Adequate surfacing for dry weather haul and all season light vehicular use would be durable rock of sufficient depth **or** for typical soils in this watershed, a recommended depth of 6 inches of durable rock to prevent road damage, offsite erosion, or stream sedimentation.

Native surface roads and roads with inadequate surfacing for wet season haul would be restricted to the dry season, generally between May 15 and October 15 to minimize erosion and road damage. The Authorized Officer may extend the hauling season if dry weather and dry road surface conditions exist. Adequate surfacing for wet season haul would be durable rock of sufficient depth, **or** for typical soils in this watershed, a recommended depth of 10 inches of

durable rock* to prevent road damage, offsite erosion, or stream sedimentation. Durable rock is defined as "clean, hard rock without many fines.

* Rock depth taken from Oregon Department of Forestry (ODF) Technical Note Number 9.

All roads without BST surfacing that would be used for wet weather haul would have a water dip and/or cross drain culvert located within 50 to 100 feet of all streams crossings. Drainage features should be situated as close as possible to the stream crossings (RMP p. 159), and allow between 15 and 200 feet of ground filtering between the drainage outlet and the high water level of the stream to minimize the amount of sediment entering stream channels. Filtering distance depends, in part, on the slope of the ground below the drain discharge, the road grade and the distance to the next drainage feature along the road.

Cross drain spacing for new and reconstructed roads would be done in accordance with the RMP Tables 1-A and 2-A (pg 176-177) to reduce erosion. Where needed, additional cross drains would be added to prevent stream sedimentation along existing haul routes. Selected erosion prevention and sediment control measures must be implemented prior to the wet season (generally Oct 15th).

Hauling on all road types would be suspended at any time-during and immediately following precipitation events if saturated road surfaces would result in continuous mud splash or tire slide; surface rutting; fines being pumped through road surface from the subgrade; road drainage causes a visible increase in stream turbidities or more than ten percent cumulative increase in natural stream turbidities as measured relative to a control point above the road; or road surface conditions would result in water being redirected into tire tracks or away from designed drainage patterns.

2.3.4 Special Status Plants and Noxious Weeds

All special status plant species would be buffered from project activities except as described below (RMP p.51). The size of the protection buffer would be determined on a case-by-case basis depending on the species and its habitat requirements, but would be a minimum of a 20' radius for sensitive species. Burns in areas containing special status plant species would follow prescriptions that would result in cool burns which would minimize potential damage to plant populations. Prescribed fire operations would be done in manner which strives to reduce or eliminate burning through identified special status plant populations depending on the adaptability of each species to fire.

Project design criteria (PDC) for T&E listed species (*Fritillaria gentneri* and *Lomatium cookii*) are in accord with the FY04-08 Rogue River/South Coast Biological Opinion:

- A minimum 25' radius buffer. No mechanized activity would occur in the buffer. Buffers can be treated manually (burning, hand brush/tree removal, sowing adapted native grasses etc.) during the dormancy period (September-February) for activities that benefit the species.
- Tree falling, yarding or anchor tree location would not occur in or across buffers.
- Construction of new landings would be at least 300' from known sites.

- Proposed logging road location, including temporary haul roads, would be surveyed and populations protected by a minimum 100' radius buffer. Use of existing roads within 100' of occurrence is allowed.
- Firewood collection would not occur in buffers.
- Cut material would be piled outside buffers.
- No tree planting or mechanical scalping would occur within 75'of the buffer edge (100' from occurrence).

Noxious weeds would be treated using an integrated pest management approach (RMP p. 92). Management objectives are to contain or eradicate populations of listed noxious weeds. Populations of noxious weeds would be contained using appropriate methods based on species and conditions as directed in the Medford District Integrated Weed Management Plan (PA-OR110-98-14). All treated noxious weed populations would be monitored for treatment effectiveness.

- All heavy equipment, including brushing machinery, would be pressure washed to remove all dirt and debris prior to entering BLM lands and when moving from infested to non-infested areas within the project area. This includes a thorough cleaning of the undercarriage in a designated cleaning area. Cleaning areas would be subsequently monitored for infestation and weeds would be treated.

- Haul truck turn-arounds would not be constructed in known noxious weed populations (BLM map to be provided).
- Equipment and material would not be stored in known weed populations (BLM map to be provided).

- Temporary roads would not be constructed through known weed sites unless the area is treated for noxious weeds prior to road construction.

- Roadsides disturbed by project implementation (culvert and road shoulder work) would be re-vegetated after implementation.
- Roads to be decommissioned would be treated for noxious weeds prior to decommissioning and re-vegetated as necessary after decommissioning.

- Seed and straw used for restoration, replanting of bare soil, and post treatment throughout the project area would be native species and weed free to prevent the further spread of noxious weeds. All seeding would be contingent on seed availability.

2.3.5 Wildlife

Seasonal restrictions for wildlife species would be implemented as per Table 2 above.

All snags ≥ 16" DBH would be reserved from cutting unless they pose a safety hazard, in which case they would be left on the ground in the unit and a replacement standing tree would be identified for retention.

Where feasible, snag patches (6 or more snags) would be buffered by one half to one site tree height to protect the snag patch from damage during logging operations.

Prior to prescribed burning, duff would be pulled away from the base of snags to reduce the chance of losing them during burning.

Coarse woody debris (CWD) would be retained and protected from disturbance to the greatest extent possible during logging, burning and other project activities.

Deer Willy PDF for CWM Retention

In some of the areas identified for level 2 treatments, retention and creation of additional coarse woody material (CWM) is required. This PDF would be applied to approximately 270 acres of Level 2 treatment units that are of sufficient size to facilitate wildlife habitat development. Specifically, the CWM retention targets for these areas should meet the Landscape level goals as described for the 50% tolerance limit for Southwest Oregon Mixed Conifer-Hardwood Forest, Small/medium Trees within *The Decayed Wood Advisor* (DecAID, http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf)

The actual number of pieces per acre on the ground can vary on a per acre basis, but the total amount of CWM within the treatment area should equal the overall target of that treatment unit (i.e. the CWM does not need to be evenly distributed across the treatment unit). CWM already existing within the treatment area can contribute to the target, providing it meets the minimum dimensions of qualifying CWM. Some or all of the CWM may be left standing in order to: reduce on-ground fuel buildup, to prevent log rolling on steep ground, to provide wildlife habitat, and for safety or economic reasons. While it may remain upright for a few decades it will come down eventually and contribute to site productivity in other ways (SW Oregon LSR Assessment 1995). If a tree is left in this fashion, it would be identified during project implementation.

Deer Willy PDF for canopy retention in Northern Spotted Owl habitat

All activities proposed under the Deer Willy project must be in agreement with the FY 08 NLAA BA/LOC consultation. In general, the habitat (NRF or Dispersal) of any treatment area must be maintained at its current level, and can not be degraded such that the habitat no longer meets the requirements of the original habitat classification post-treatment. The following criteria must be met during project implementation:

1) In all units that qualify as Nesting, Roosting and Foraging (NRF) habitat prior to treatment, the overstory canopy cover must be maintained at 60%.

2) In all units that qualify as Dispersal habitat prior to treatment, the overstory canopy cover must be maintained at 40%.

2.3.6 Fire and Fuels Management

Prescribed burning would be consistent with the Oregon Department of Forestry's Smoke Management Plan and the Department of Environmental Quality's Air Quality and Visibility Protection Program. Additional measures to reduce smoke emissions would include rapid mop-up, burning with lower fuel moisture in smaller fuels to facilitate quick and complete combustion, burning with higher fuel moisture in the larger fuels to minimize consumption and burn out time, and covering hand piles to permit burning during the rainy season when atmospheric mixing and smoke dispersal are more likely.

All prescribed burn areas with sensitive plant species would be burned under the weather, fuel conditions or season that minimizes impacts on plant reproduction and active growth. Low intensity (winter/spring) under burning could occur after mechanical treatment to reduce fuel hazard. Fires would be allowed to back into riparian reserve no-treatment areas, but no ignition would take place within 50' of streams.

Patrol and mop-up of burned areas, which may include use of a helicopter and water bucket, would help prevent reburn or fire escape.

For biomass extraction on slopes <35% slope, low impact ground based equipment such as pickup trucks, all-terrain vehicles, small tractors or rubber tire skidder may be used. Skidding by draft animals will also be acceptable. Skid roads would be ≥ 75' feet apart. In the riparian areas, ground based extraction would be limited to existing skid trails and roads.

Where appropriate, biomass extraction would be performed by low level aerial cable yarding systems which offers one end log suspension for at least 80% of the turns. This method of cable yarding is designed to offer maximum equipment mobility while still allowing the operator to cover a large area of ground per setup; this setup allows lateral yarding capabilities. Equipment of this type would generally be used within 200' of roads with slopes >35%.

2.3.7 Road and Transportation Systems Management

When roads would be used for more than one season, temporary roads or roads slated for decommissioning would be winterized and treated for erosion control (water barred, seeded, mulched, etc.). Temporary blocks would prevent wet season use prior to decommissioning.

All new road construction and improvement would be done at the minimum standard appropriate for the intended long term use of the road. New temporary spur roads would have a subgrade no wider than 17' with a running surface no wider than 12'. All roads used during the wet season (October 15 through April 15) would be surfaced with 4" to 10"" of crushed aggregate if necessary (Also see PDFs for hauling above). During the wet season, these roads would be treated for erosion control (water bars, seeding, mulching) or slash where needed, as mentioned above for skid roads under tractor logging). Temporary blocks would be placed where needed to eliminate wet season use.

All temporary spur roads would be constructed and obliterated in the dry season. Temporary roads would be winterized by installing water bars or water dips, seeding, mulching and

surfacing the road. Roads would be replanted as necessary after obliteration.

Dust from log hauling would be abated as necessary to promote safety and road longevity. Dust abatement may include the application of water or lignin, and/or reduced vehicle speed.

For road renovation:

- When multi-layered canopies occur adjacent to the road, leave dominant trees in each canopy layer to aid visual screening.
- Seed and mulch cut banks to blend with the surrounding area
- Plant shrubs and/or conifers that belong to the Douglas-fir and pine plant series.

2.3.8 Recreation

The project area has open, limited and closed categories for off-highway vehicle (OHV) use (RMP p.109). If resource damage from OHV use is documented, steps will be taken to control the use through signing, barriers, monitoring and increased law enforcement activity.

To reduce the possibility of damage to resources from unauthorized OHV use, fireline construction would not be done within 100 feet of roadways until project is implemented. Vegetation removal would be minimal for the first 100 feet, routing the fireline around existing vegetation where possible. Upon completion, vegetation would be pulled back over the first 100 feet of fireline.

2.3.9 Cultural Resources

There are four recorded cultural sites in the project area. Two are within treatment areas and these sites would be buffered prior to project implementation. Flagging would be placed 20 feet beyond the known site boundary. No fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources.

Timber would be felled away from buffered cultural site perimeters.

If unrecorded cultural sites are found during project implementation, a cultural resource specialist would be informed who would provide appropriate protection measures.

2.3.10 Visual Resources Management

The VRM classes in the project area are VRM III and VRM IV. Class III objectives are to manage lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Class IV objectives are to manage lands for high levels of change. Management activities may dominate the view and be the major focus of viewer attention. (VRM Manual 8431)

On VRM III treatment areas visible from Key Observation Points (KOPs) (see effects section for details):

- Feather edges of treatment areas with untreated areas to blend the vegetation and avoid lines. Retain a mix of tree/shrub sizes and species along edges.

- Mimic natural shapes and lines (no straight lines) when determining edge of treatment areas.

2.3.11 Port Orford Cedar

Port-Orford-cedar in the project area would be managed according to the May 2004 BLM POC-FSEIS/ROD. Mitigation measures would be implemented if uninfected POC are in, near, or downstream of the activities (USDA-USDI 2003).

- Prior to entering a POC area or leaving a *Phythophthora lateralis* (PL) area, all heavy equipment would be washed according to Management Guidelines in the Port-Orford Rangewide Assessment (USDA-USDI 2003)
- When feasible, operations would be limited to the dry season/dry conditions in infected and uninfected areas.
- When feasible, work would be done in uninfected areas prior to conducting work in infected areas.
- Water used for road and prescribed fire operations would be from uninfested water sources or treated with the appropriate levels of Clorox® as described in the POC-FSEIS/ROD (p. 62).
- Clorox® bleach would be added after tanks have been filled and are away from waterways.
- Access and egress routes and parking areas would be designated by BLM.

2.3.12 Riparian Reserves

The Medford District Resource Management Plan (RMP) established riparian reserves to maintain and restore riparian functions, provide benefits to riparian dependent and associated species, and provide for greater connectivity within a watershed. The current trend in overly dense small diameter riparian stands within the project area is away from the desired future condition.

Within riparian reserves, trees to be removed from the site would be directionally felled to pre-approved skid trails. To meet the desired condition of 40 key pieces of in-stream large woody debris per mile and 15 pieces of down wood per acre, trees ≥12" DBH within the riparian reserve would be directionally felled towards the stream or retained for placement at designated locations.

To maintain stream shade: a) maintain a 50′ no treatment area along all streams except for POC sanitation, b) retain trees >12″ DBH within 150′ of any perennial stream, and c) maintain canopy closure at 60+% within a riparian reserve. Where the existing closure is below 60%, vegetation / fuel treatments would be limited to the understory, d) in the POC sanitation remove trees ≤ 20" DBH. If said POC removal would reduce canopy closure below 60% on or near 303(d) listed streams, some of the POC would be girdled instead of removed.

Prescribed burning could occur in riparian reserves with the following stipulations: a) hand piles within 50′ of a stream would not be burned, b) no direct ignition would be done within the 50′ no treatment zone, and c) underburns initiated outside of the 50′ buffer would be allowed to back into this buffer as long as the underburn is of low intensity and the mid-level and upper canopies are not at risk. These limitations are directed particularly at protecting the aquatic ecosystems from runoff and shade reduction.

2.3.13 Soil Productivity and Hydrology

On very steep sites susceptible to ravel, fuel reduction treatments would be done manually to ensure duff retention. No more than 30 burn piles per acre would be created.

When a >16″ dbh tree is thinned from a stand, the top (<8″ diameter) and limbs would be removed and disposed of. The bole would be left on site for coarse wood debris (CWD) if: a) it is highly likely to last into the future, and b) >20 tons/acre would remain following treatment where 80% of the tonnage is within 1000+ hr fuel class.

No new skid trails or stream crossings would be constructed in riparian reserves. Existing skid trails could be used if they are stable and not recovered. These trails would be decompacted and planted according to prescription, and covered with mulch or small diameter slash (less than 8″ thick.

3.0 ENVIRONMENTAL CONSEQUENCES

This section provides the basis for the comparisons of the alternatives and the reasonably foreseeable environmental consequences to the human environment. Impacts can be beneficial, neutral, or detrimental. This analysis considers the direct impacts (effects caused by the action and occurring at the same place and time), indirect impacts (effects caused by the action but occurring later in time or offsite) (40 CFR 1508.8), and cumulative impacts (effects caused by the action when added to other past, present and reasonably foreseeable future actions on all land ownerships). The temporal and spatial scales used in this analysis may vary, depending on the resource being affected.

As the Council on Environmental Quality (CEQ), in guidance issued on June 24, 2005, points out, the "environmental analysis required under NEPA is forward-looking," and review of past actions is required only "to the extent that this review informs agency decision-making regarding the proposed action." A description of current conditions inherently includes the effects of past actions and serves as a more accurate and useful starting point for a cumulative effects analysis than by "adding up" the effects of individual past actions. "Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." (CEQ Memorandum 'Guidance on the Consideration of Past Actions in Cumulative Effects Analysis' June 24, 2005.)

The CEQ guidance specifies that the "CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions." Following

review of the guidance and examination of the proposed project, the team found that an exhaustive listing of past projects and speculation on the effects of each would not provide needed data to make an informed decision.

The interdisciplinary planning team evaluated past actions and found that cataloging past projects and their individual effects would not be useful in discerning the contribution of the incremental impact of the project's action alternatives.

Information on the current environmental condition is comprehensive and more accurate for establishing a baseline condition for a cumulative effects analysis than attempting to establish such a starting point by adding up the effects of individual past actions. This would provide a list of effects without addressing the changes or improvement in conditions since the action originally occurred; unlike current conditions, past actions and perceived effects can no longer be verified by direct examination.

However, cataloging and analyzing other present and reasonably foreseeable actions relevant to the effects of the proposed action *is* necessary and is described below. By comparing the "no action" alternative (current condition) to the action alternatives, we can discern the "cumulative impact" resulting from adding the incremental impact of the proposed and future foreseeable actions to the current environmental conditions and trends.

The planning team weighed the scientific evidence offered through public comments, as well as that gathered by each resource specialist. Environmental consequences of each alternative were analyzed utilizing the best scientific data available, knowledge of on-the-ground conditions, and professional expertise of each member of the planning team. While additional information would often add precision to estimates or better specify a relationship, the basic data and central relationships are sufficiently well established that any new information would not likely change relationships or conclusions. Although new information would be welcome, the team did not identify any missing information as essential for the Decision Maker to make a reasoned choice among the alternatives.

Private industrial and Josephine County forest lands exist throughout the watershed, encompassing 6,282 acres. These lands are expected to be managed for commercial timber on a regular rotation and are expected to remain in early to mid seral stages.

Past, current and foreseeable future fuel hazard reduction projects total approximately 400 acres distributed across the watershed.

While it can be assumed that O&C lands in the project area will continue to be managed for timber production, no additional timber sale or other vegetation treatment activities are projected to occur in the watershed on federal lands in the next five years.

Rural development across the watershed has modified the landscape and ecological processes through construction of new homes and roads, and water diversions and well drilling which has disrupted hydrologic processes and further fragmented the landscape

The Western Oregon Plan Revisions, although reasonably foreseeable, are still in process and subject to change based on public comments, scientific review and subsequent administrative remedies. They therefore provide insufficient information for meaningful consideration at this time. It is not the intent of the planning or NEPA processes to recalibrate all analyses of existing plan implementation actions whenever a new planning effort begins consideration of a broad array of management guidelines and alternative allocations at the programmatic scale. See *NAEC v. Kempthorne*, 457 F.3d 969, 979-80 (9th Cir. 2006) finding it lawful to consider the cumulative effects in the later broad-scale planning analysis.

Additionally, the purpose of this current proposal is to implement the existing Medford Resource Management Plan (RMP). This EA has been prepared to determine if any significant environmental effects of the proposal are substantially greater than what has already been analyzed in the existing RMP's programmatic EIS. The EIS associated with the current Western Oregon Plan Revision effort contains a cumulative effects analysis that incorporates these implementation actions (projected to occur under the existing plan as the "No Action" alternative and possible ongoing actions carried forward into the action alternatives), in a manner appropriate to the land use planning scale. The Western Oregon Plan Revision EIS therefore serves as the appropriate vehicle for analyzing the cumulative effects of each land use alternative's management scheme. Any potentially cumulative effects of this proposal at the programmatic level that would be relevant to the proposed plan revision will be considered in that process.

Unless addressed specifically, the following were found not to be affected by the proposed action or alternatives: air quality; Native American religious concerns; prime or unique farmlands; floodplains; wild and scenic rivers; and wilderness.

3.1 Fire and Fuels Management

Affected Environment

Wildfire History

The project area is within the Klamath Province Region in southwestern Oregon where fire is recognized as a key natural disturbance (Atzet and Wheeler 1982). Fire has played an important role in influencing successional processes and creating diverse forest conditions.

Prior to the 20th century, low severity fires burned regularly in most dry forest ecosystems, with ignitions caused by both lightning and humans. Low severity fire influenced regeneration of fire-intolerant species, promoted fire tolerant species such as ponderosa pine and Douglas-fir, maintained an open forest structure, reduced forest biomass, decreased the impacts of insects and diseases, and maintained wildlife habitats for many species that utilize open stand structures (Graham et al. 2004). Native Americans influenced vegetation patterns for over a thousand years by igniting fires to enhance values that were important to their culture (Pullen 1995). Early settlers used fire to improve grazing and farming and to expose rock and soil for mining. Based on fire scars and vegetative patterns, large, low to moderate severity fires were a common occurrence in the area.

In the early 1900s, suppression of all fires became a goal of land management agencies. This altered the fire return intervals and severity from what would take place under the historic fire regime. Two to five fire cycles have been missed in the southwest Oregon mixed conifer forests that occur at low elevations (Thomas and Agee 1986). As a result, fuel loading has increased and plant succession shifted to fire-prone vegetative conditions. Fire-tolerant species such as ponderosa pine and oaks have decreased. Many stands, which were once open, are now heavily stocked with conifers and small oaks which have changed the horizontal and vertical stand structure. Surface and ladder fuels have increased, increasing the potential for large scale crown fires which were once historically rare.

In the past 20 years in Southwest Oregon we have experienced large fires that burned at higher intensities than would have been the case under historic conditions. Unless the vegetative conditions that have occurred as a result of the fire suppression policies over the past century are altered to be consistent with the natural or historic fire regimes of the area, we expect a continuing trend of increasing numbers of large, high intensive fires. Wildfires in the project area occur predominately from July through September.

Fire Regime Condition Class (FRCC)

Fire regime condition classes offer another approach to evaluating potential fire conditions and are most useful at the watershed and larger scales. Treatment effects are reflected in changes in the acreage in each FRCC. FRCC's are a function of the degree of departure from historical vegetation and disturbance regimes. These departures result in forest component alterations such as species composition, structural stage, stand age, and canopy closure. There are three fire condition classes:

FRCC 1 - (17% of project area) Fire regimes are within or near the historic range for the area. The risk of losing key ecosystem components is low. Vegetation species composition and structure are intact and functioning within the historical range for the area.

FRCC 2 – (49% of project area) Fire regimes have been moderately altered from their historical range (i.e., missed more than one return interval). This change results in moderate changes to one or more of the following: fire size, frequency, intensity, severity, or landscape patterns.

FRCC 3 – (33% of project area) Fire regimes have been significantly altered from their historical range. The risk of losing key ecosystem components is high. This change results in increases to fire size, frequency, severity, and landscape patterns.

Alternative 1: No Action

Stand Level Effects

No action would continue conditions that have a high potential for large, high intensity fires. Fuel hazard would increase as vegetation continues to develop on current successional trajectories. Surface fuels would increase due to tree mortality in dense stands as higher levels of insect and disease mortality are expected. Canopy Base Height (CBH) would decrease due to understory density increases, increasing the potential for crown fire initiation. Canopy Bulk Density (CBD) would increase, as would the potential for active crown fire events. The shift to more shade tolerant species would continue in dense overstocked stands.

With these conditions, wildland fire fighters and the local public would be at greater risk of loss of life and property. Direct attack capabilities would diminish as fuel hazard increases and deteriorated roads become less accessible. Initial attack success would decline over time resulting in larger fire sizes. Aerial attack effectiveness would decrease with extreme fire behavior and, as upper and mid level canopies close, penetration of aerial applications of water or retardant would reduce. As a result, in the event of a wildfire, many stands would experience stand replacing wildfires.

Project Level Effects

With the no action alternative, the project area would continue on present trajectories of unnaturally heavy fuel loads, over stocked stands, and increased shade tolerant / fire intolerant vegetation. Fire risk would increase proportionately with increases in population, residential development and recreation.

As the acreage of high fuel hazard increases, the potential for high severity wildland fire increases. Strategies and tactics for fire suppression would shift to indirect attack utilizing topographic features such as ridgetops and existing roadways resulting in larger fire sizes. Suppression tactics would include thinning and pruning vegetation along roadways without any ecological considerations for species diversity, stocking levels or seral stage considerations; ridgelines are often cleared with tractors or bulldozers with widths ranging from 10 – 40 feet. Initial attack suppression goals (94% of new fire starts confined to 10 acres or less) would become increasingly difficult to attain due to increased fire line heat and flame length. Therefore, the potential for a fire start to develop into a large fire would continue to increase.

Alternative 2: Proposed Action

Fire hazard reduction treatments would occur on approximately 3,694 acres (level 1) and 877 acres (level 2) in strategic areas (within 200' of roads and ridgelines). Fire intensities and severities will be greatly reduced in treatment areas in high risk and high hazard areas. Untreated stands would have the same wildfire behavior and intensity as those described in the No Action alternative.

Initial attack effectiveness and public and fire fighter safety will increase throughout the project area. Treated stands would be more resistant to crown fire due to the reduction in crown base height and crown bulk density, reducing mortality to overstory vegetation. Potential for large scale, high intensity fire will be reduced with the utilization of strategic fuel treatment areas as fire suppression would be more successful across the project area.

An increase in solar radiation on the forest floor may increase surface temperatures, decrease fine fuel moisture, decrease relative humidity, and may increase surface wind speeds compared to un-thinned stands, increasing fire hazard if surface fuels are untreated. Therefore, surface fuels would be reduced to minimize the potential for high severity, high intensity fire.

Biomass removal would be utilized wherever feasible and would reduce the need for handpiling and burning. Some areas would still require burning activities to complete and maintain the treatment areas. Handpiling and burning, and underburning would produce smoke, but at lower levels than a large wildfire. Prescribed burning would conform to the Oregon Smoke

Management Program. All burning activities would comply with the national ambient air quality standards for particulates (PM 10 and PM 2.5).

Project Level Effects

Due to urban growth, and increases in population, recreation and tourism in the Applegate Valley, fire risk is expected to increase. The priority for fuel hazard reduction treatments is to treat fuels in and adjacent to the populated areas, and along strategic roads and ridges.

Fire intensities and severities will be greatly reduced in treatment areas near high risk and high hazard areas. Untreated stands would have the same wildfire behavior and intensity as those described in the No Action alternative.

Initial attack effectiveness and public and fire fighter safety will increase throughout the project area. Treated stands would be more resistant to crown fire due to the reduction in the crown base height and crown bulk density, reducing mortality to overstory vegetation. Potential for large scale, high intensity fire will be reduced with the utilization of strategic fuel treatment areas as fire suppression would be more successful across the project area.

Cumulative Effects

Fuel Reduction and Fire Behavior

The proposed strategic fire hazard reduction treatments would create defensible areas throughout the project area and return those treated areas of the project to near historical ranges of fuel loadings. This would result in a reduction of fire hazard, fire size and reduced chance of loss of values at risk in the project area. Wildland firefighter and public safety would greatly increase in treated areas and near improved road systems. Direct attack fire suppression strategies and tactics could be used to control fire, resulting in fewer acres burned and less threat to private property.

While the potential for high severity fire is expected to decrease by creating fire-resilient forests, predicting fire behavior in all instances is very difficult. Studies by Pollet and Omi (2002), Moore et al (1955), Van Wagner (1968), Omi and Martinson (2002) provide strong evidence of fuel treatment efficacy. However, even with past and anticipated treatments, the potential for a high severity fire remains high across the watershed due to the level of untreated acres and the unpredictability of human caused fires. It can be expected that extreme fire behavior would be moderated in thinned stands and overstory mortality can be reduced by as much as 60% as compared to untreated stands.

3.2 Road and Transportation Systems Management

Affected Environment

There are approximately 417 miles of road in the Williams 5th field watershed (USDI 1996). Road density and types of roads are variable across the Williams Watershed. In the Williams 5th field watershed the average road density is 5.1 miles / mi^2, road density on BLM land is 4.5 miles/mi^2 (USDI 1996). Road densities are high in the project area, averaging 7.4 miles/mi^2.

Most BLM roads in the project area were constructed for mining and timber activities and

improved for timber management objectives. From the 1960s through the 1980s, roads were mostly maintained in conjunction with timber haul. Beginning in the 1990s, however, reduced timber hauling and funding for road maintenance has caused some road maintenance activities to be deferred.

Road conditions vary depending on road surface type, use, location, weather, maintenance cycle, and soil type.

Alternative 1: No Action
The no action alternative would have no effect on road density. The no action alternative would continue to leave BLM roads without repairs until cyclic maintenance can be accomplished. Erosion and sedimentation on those roads would continue.

Alternative 2: Proposed Action

Road Density
The renovation of 4.06 miles of new BLM system roads would not increase the existing road density in the Williams Watershed. The average road density in this watershed would not increase. Renovation will improve existing roads, facilitating drainage and reducing risk of sediment transfer.

Road Improvements and Deferred Road Maintenance
Approximately 173.5 miles of road would be maintained, thus reducing deferred road maintenance and also improving driver site distance. Road renovation and improvements would have minimal short term erosion and sedimentation but in the long term would decrease the amount of erosion and sedimentation from current levels (See soils section below for details).

3.3 Vegetation/POC

Affected Environment
When assessing vegetation trends, plant series can be used as a general indicator of abiotic or biotic influences, such as topographic position (slope, aspect, etc.) and soil productivity, respectively. Most of the project area is capable of producing closed-canopy (>60% crown closure) coniferous forest conditions since it is dominated by Douglas-fir, tanoak, white fir and Port-Orford cedar plant series. White fir dominates in the upper elevations of the project area, while a mix of Douglas-fir and tanoak is found in the lower elevations along the southeastern portion of the project area. The Port-Orford cedar series is associated with moist forest conditions found within the lower gradient streams in the project area (Powell, Cedar, Bill, and portions of Williams Creek). Douglas-fir dominates in the northeastern portion of the project with an elevational band also swinging into the southeastern portion of the project area between the Douglas-fir / tanoak and white fir series areas. The white oak series is only found in a few areas in the northeastern portion of the project area. The distribution of this series is primarily tied to soils with low water holding capacity.

The most productive plant series (reflected in average basal area) found in the project area is the white fir series, which is found on approximately 25% of all lands in the project area (Table 3). The next most productive is the Port-Orford cedar series but this series is found on only 2% of the project area. The Douglas-fir / tanoak series has a little higher productivity than the pure Douglas-fir series but is only third in overall distribution (~17% of the project area). The white oak series is the least productive and plays the most minor role with less than one percent of the entire project area in this series. Historically the areas currently mapped as white oak dominated might have been slightly larger; conifer encroachment is the main cause for reduction in acreage. Highly productive soils (found on 99% of the project area) are the limiting factor restricting oak woodlands in the project area.

The white oak series is significantly lower in productivity and can be considered more of an open-canopy hardwood forest rather than one that can support high canopy closures for late-successional dependent species such as the Northern Spotted Owl. The rest of the project area is better suited for supporting late-successionl forest structures.

Table 3. Plant Series on all lands in the project area

Plant Series	Acres	Percent	Average Basal Area (ft^2/acre)
Douglas-fir	11,166	52	254
White fir	5,438	25	341
Douglas-fir / Tanoak	3,673	17	254 / 262
Private (no data)*	640	3	NA
Port-Orford Cedar	413	2	341
White Oak	108	<1%	46
Total acres	***21,438***		

*T39S-R6W-Section 10: surrounded by BLM land in white fir series

Vegetation trends applicable to this project include density of trees in the smallest size classes and the relative amount of healthy Port-Orford cedar distribution versus infected areas. As this project is confined to reduction of fuel hazards and potential spread of POC root disease along roads, it is not expected to affect disturbance history, insects/disease impacts, tree size class, age of forested stands and species diversity.

Tree density / stand dynamics

There many different stand structures found in the project area but only two general types are discussed here since the proposed action is split into two main thinning prescriptions. The two stand types are: less than 80 year old stands dominated by trees <20 inches dbh, (level 2 thinning) and older forest stands dominated by trees >15 inches dbh (level 1 thinning). In managed plantation stands typical of those proposed for level 2 density management treatments, the trees/acre ranges from 100 to 400 trees/acres. In many of the plantation stands the vegetation trends are such that canopy closure is generally >90% with crown recession happening because of lack of sunlight to the lower limbs. Diameter growth is inhibited by inter-tree competition and understory diversity is lessened because sunlight is not available to the forest floor. Many of the hardwoods are also starting to be suppressed within these plantation

stands. For the older stands proposed for level 1 thinning, the larger overstory has highly variable spacing with some of the largest trees spaced almost 40 to 50 feet apart. Understory composition in these stands is also highly variable but overall the highest amounts of small, suppressed trees can be found in these stands. Where understory densities exceed 500 trees/acre or greater, these densities are a concern for providing fuel ladders for fire to threaten the larger trees as well as inhibiting healthy conifer / hardwood layers for structural diversity objectives.

Port-Orford Cedar (POC)

As mentioned earlier, POC is mostly associated with riparian areas in the project area but POC is also found on upland areas in various amounts ranging from 5 to 100 trees/acre. Since POC root disease is a water-associated pathogen, most of the infection is found in areas where standing water is able to collect (streams, roadside ditches, seeps, etc.). Aerial photo interpretation done by a BLM contractor in 1996 and 2001 found 846 acres of infected areas. During a separate mapping project done by a BLM forester in 2000, an additional 4,098 acres of healthy POC were mapped on a stand basis to show relative distribution of POC in the watershed. The GIS analysis on these layers removed overlapping polygons, so the total infection level is 17% of the POC in the project area. This infection level gives a broad perspective on distribution of infection but it is important to note that where the root disease is active, mortality levels often exceed 90%. There has also been more spread observed by district POC coordinator outside of areas mapped during the 1996 and 2001 surveys.

Alternative 1: No Action

The trends described for plantation and older forest stands will be allowed to continue in the no-action alternative. The only future foreseeable actions expected on BLM land in the project area will be pre-commercial thinning / brushing of younger (<30 year old) plantation stands. Since funding for these forest development activities area limited, stands away from private residences that receive pre-commercial thinning typically do not get handpiled and burned. The slash left by these activities will further exacerbate the fuel hazards that currently exist in the project area. Many of the older plantations prescribed for level 2 thinning in the proposed actions are passed the pre-commercial thinning point so many of these will not be pre-commercial thinned in the future. When stands grow past this point, the material is too large to either be left on site or piled and burned without damaging the residual trees. Private industrial forestland in the project area is expected to continue to be managed with even-age harvest methods. These areas will remain in the early, pole and mid size classes with limited time spent in the mature class before the next even-age harvest.

Information from surveys on all federal lands and collated by the Siskiyou National Forest indicates that POC root disease infects trees on about 15% of of the total area occupied by Port-Orford-cedar on public lands in Southwest Oregon and Northwest California. Infection is predicted to reach 17% in 100 years (USDA-FS and USDI-BLM 2004). Infection will continue to be concentrated in wet, low-lying areas where conditions are especially favorable for the disease organism. Port-Orford-cedar growing on dry sites, on convex slopes, and away from streams and roads will continue to have limited vulnerability. The no-action will allow currently infested soil on high-risk sites (along roads, near stream crossing and low lying wet areas) to be transported unknowingly by animals, foot traffic and vehicles elsewhere within and outside the project area.

Alternative 2: Proposed Action
Level 1 thinning in older forest stands will leave understory trees spaced 20 to 25 feet apart (70 to 100 trees /acre). Spacing specifications are such that the most vigorous conifers and hardwoods will be left on a grid spacing that will ignore the density of trees >12" inches. This method of understory thinning allows for a healthy mixed species understory component to provide for structural and species diversity. The understory will be less susceptible to fire initiating into the crown at least immediately after thinning, but as these trees grow and new trees regenerate, fire will be a greater concern (about 10 to 20 years after thinning). Follow-up maintenance and low intensity underburning will aid in maintaining this desired condition in the future.

Level 2 thinning in plantation / young stands (<80 years old) will leave the largest trees to achieve an average canopy closure of 50%. Where opportunities exist, large non-tanoak hardwoods would be the preferred leave species in these stands in order to perpetuate this stand component into the future. The reduction of inter-tree competition will allow for increased sunlight, nutrients and water to the residual trees, hastening stand development into a larger tree size class. These larger trees will be less susceptible to low intensity ground fire, and the canopy separation provided by the thinning would limit crown fire spread in the event of a more intense wildfire. The ability to yard the cut material will also lessen the amount of activity fuels left on site. Once thinning occurs, low intensity underburning is a feasible option for maintaining these stands in the desired condition.

Removal of Port-Orford Cedar on high-risk sites (roadside sanitation) has been tried on a very limited basis, with no official studies available in peer-reviewed literature. The preferred strategy, at least initially, has been to close roads either permanently or by gating roads. The Grants Pass Resource Area employed this strategy in the 1990's in the project area with mixed results. Off-highway vehicles have breached both the gates and the decommissioned roads to varying extents. Illegal bough cutters have also been linked to new infection areas, such as in Mungers Creek. The proposed roadside removal of Port-Orford Cedar on up to 426 acres is an attempt to address the concern that foot and vehicle traffic could spread the disease within and outside the project area, at least on an experimental basis.

3.4 Soil Productivity and Hydrology

Methodology
The Resource Area hydrologist used a Change Detection geographic information system (GIS) for analyzing the existing conditions of the Upper Deer Creek, West Fork, East Fork and Lower Williams 6th Field watersheds. Change detection analysis measures acres of openings caused by actions from the past 30 years such as stand-replacing harvests or wildfires using satellite imagery data. This data is used to assess the effects of harvest on the watershed's hydrology. BLM Riparian Reserve surveys determined functioning condition of streams on BLM lands (USDI 1995, 2000).

The scale for this analysis is the 6th field watershed level for cumulative effects analysis. The 6th field watershed scale is appropriate because the proposed project lies within these boundaries and effects from the project are not expected to occur outside the 6th field watershed.

The Medford District Resource Management Plan (USDI 1995) assessed the effects of projects of the 5th field watershed scale and relies on Best Management Practices (BMP's) to comply with the Federal Clean Water Act. BMP's are considered the primary mechanisms to achieve Oregon water quality standards (USDI 1995, p.151).

Assumptions

For purposes of this analysis, we assume that private lands would remain in an early to mid-seral condition with high densities of roads. We also assume that private lands may also use ground-based logging on highly erosive soils, resulting in greater risk of erosion.

Affected Environment

The approximately 25,500 acre Deer Willy planning area is about 50% of the total acreage in the Williams basin (51,971 acres) but includes 13% (1,848 acres) in the 14,346 acre Upper Deer Creek 6th field (Table 4). There are 264 acres in the Thompson Creek watershed but no actions are proposed in that portion. The project area consists of portions of thirty-one 7th field drainage areas. The Deer Creek watershed analysis and Williams Watershed Assessment (USDI and USDA 1994, 1997) provide general water resources background information for the project planning area.

Numerous disturbances have occurred in the Williams and Deer Creek 6th field watersheds in the past 55 years. Between 1972 and the present, 4,942 acres (4,341 in the Williams watershed, 17% of watershed area) have been harvested from 1972 to 2002; the majority of harvest occurred from the late 1970s to the early 1990s. Non-forested acres, including agricultural land, roads, and impoundments, cover 16,360 acres (30% of watershed area) in this watershed; 23% of the watershed is on private lands.

Table 4. Analysis Areas (in acres) Associated within the Deer Willy Planning Area

Watershed Name (HUC6)	Private land (%)	Federal land		Other	Total
		BLM (%)	USFS	State	
Upper Deer Creek	3,140 (22)	10,988 (77)	177	41	14,346
Lower Williams	10,899 (53)	9,750 (42)	0	0	20,649
East Fork Williams	4,393 (39)	6,205 (55)	611	0	11,209
West Fork Williams	9,433 (45)	11,407 (54)	243	0	21,083
Total	27,865 (41)	38,350 (57)	1,031	41	67,287

The ability of BLM to improve hydrologic function and resultant effects on fisheries in this watershed is limited because the predominant factors contributing to the detrimental conditions in the streams are not subject to BLM's control or even influence.

The Deer-Willy project area falls within the East Illinois Valley/Williams-Deer LSR. The LSR is managed to protect and enhance late-successional and old growth forest ecosystems, which serve as habitat for late-successional forest associated species. Since the objective is to maintain a functional, interacting, late-successional and old growth ecosystem, natural ecosystem processes such as low level disturbances will be maintained. Smaller streams located on federal lands will have the potential to reach a level of complete or near complete rehabilitation under LSR designation. Streams located adjacent to existing roads that cannot be closed will be limited in their recovery potential.

Mining, timber harvest, road construction, agricultural use and residential development have degraded water quality from the reference condition. Residential use will most likely increase and occupy those agriculture lands being lost thus increasing water use from the ecosystem. Timber harvest on public lands will decrease from historical levels under current forest plans, as will road densities. However, logging will continue on private timberlands, which will require high densities of natural surface roads. Timber harvest on many of the private lands will also continue to employ clearcut harvest systems, which will continue to degrade water quality. Water quality can be partially rehabilitated.

Geology

The Williams and Deer Creek watersheds lie entirely within the Klamath Mountains Geologic Province (USDA and USDI 1995). The watersheds contain some of the oldest (150-250 million years) and most complex geologic assemblages along the West Coast (ARWC 1994). The Klamath Mountain province is a very old accretion of volcanic, ocean crust and sedimentary rocks that have undergone intense tectonic activity, altering their physical and chemical characteristics. The oldest rocks are to the east, with successively younger rock belts to the west. Older rocks include the metamorphosed volcanic and sedimentary rocks of the Applegate group and associated ultramafic peridotites and serpentine. Younger formations in the watershed include metamorphosed rocks of the Rogue and Galice Formations.

Soils

Erosion Potential

Table 5 shows the erosion potential of soils within the watershed. Those soils derived from the ultramafic (or serpentine) parent rock (Table 6) on slopes greater than 55% have the most extreme risk. The areas at high risk for erosion are ultramafic soils on slopes above 35% and metamorphic rocks on slopes above 55 percent. Most of the ultramafic soils are found in the upper west portion of Powell creek. Other soils with steep slopes (>35%) are also considered to be high erosion risks.

Table 5. Soils with high erosion risk within the Deer-Willy Project area

Soil Unit Name (Symbol)	Erosion Risk	Soil Unit Name (Symbol)	Erosion Risk
Beekman-Colestine complex, 50-80% north slopes (6F)	high	Pearsoll-Rock outcrop complex, 60-90% slopes (58F)	very high
Beekman-Colestine complex, 50-75% south slopes (7F)	high	Perdin cobbly loam, 30-50% north slopes (59F)	high
Beekman-Vermisa complex, 60-100% north slopes (8G)	high	Perdin cobbly loam, 30-50% south slopes (60F)	high
Beekman-Vermisa complex, 60-90% south slopes (9G)	high	Pollard gravelly loam, 35-50% slopes (62F)	high
Cornutt-Dubakella complex, 35-55% north slopes (20F)	high	Siskiyou gravelly sandy loam, 35-60% slopes (69E)	high
Cornutt-Dubakella complex, 35-55% south slopes (21F)	high	Siskiyou gravelly sandy loam, 35-70% north slope (70F)	high
Holland sandy loam, cool, 12-20% slopes (42D)	high	Siskiyou gravelly sandy loam, 35-60% south slope (71F)	high
Holland sandy loam, cool, 20-35% slopes (42E)	high	Speaker-Josephine gravelly loam, 35-55% south slopes (72F)	high
Jayar very gravelly loam, 35-70% north slopes (44F)	high	Vannoy silt loam, 35-55% north slopes (78F)	high
Jayar very gravelly loam, 35-70% south slopes (45F)	high	Vannoy-Voorhies complex, 35-55% slopes (79F)	high
Josephine gravelly loam, 35-55% north slopes (48F)	high	Witzel-Rock outcrop complex, 30-75% slopes (84F)	high; NA
Jumpoff Clay loam, 35-50% north slopes (50F)	high	Woodseye very gravelly loam, 50-90% south slopes (85G)	high
Manita loam, 35-50% north slopes (54F)	high	Woodseye-Jayar complex, 50-90% slopes (86G)	high
Manita loam, 35-50% south slopes (55F)	high	Woodseye-Rock Outcrop complex, 20-60% slopes (87F)	high
Pearsoll-Rock outcrop complex, 20-60% slopes (58F)	high; NA		

Table 6. Serpentine Soils within the Deer-Willy Project Area

Soil Unit Name	Parent Material
Cornutt-Dubakella Complex (19E, 20F, 21F)	Cornutt: mixed ultramafic rock and altered sedimentary and extrusive igneous rock. Dubakella: serpentine and peridotite.
Dubakella- Pearsoll Complex (29F)	Dubakella: serpentine and peridotite. Pearsoll: serpentine and peridotite.
Perdin cobbly loam (59F, 60F)	Serpentine and peridotite

Productivity

Soils of particular concern are the serpentine influenced Cornutt-Dubakella. Dubakella, with its clayey subsoil, is susceptible to disturbance / compaction due to high seasonal moisture content just above the subsoil that limits bearing capacity. Because of less dense and slower growing vegetation, the serpentine soils have thin duff and litter layers, which would normally protect the soil from rainfall impact and absorb some of the surface runoff. Therefore, serpentine soils have a greater risk for erosion. Dubakella and Pearsoll soils are also susceptible to slumping when roads are constructed on steep slopes. Combined Cornutt-Dubakella can be susceptible to mass movement, sliding and slumping though slopes are not steep.

The Dubakella and Pearsoll soils, derived from ultramafic rock, are moderately deep and well drained. They have low productivity because many plants cannot grow in serpentine soils. Those plants that can grow on these soils may be stunted and plant distributions are sparse relative to other soil types. The Cornutt series is formed from sedimentary and igneous rock but contains ultramafic material, which reduces productivity.

Derived from sedimentary and igneous rock, the Josephine and Speaker soils are deep and well drained, and therefore well suited for productive mixed conifer forests. Vegetation composition on the Josephine and Speaker soils consists mainly of Douglas fir, Ponderosa pine, madrone, shrubs and grasses.

The Josephine, Cornutt-Dubakella, and Pollard soil units may be compacted if wet when heavy equipment is used; designated skid trials are recommended to minimize compaction (USDA 1983). Additionally, the Cornutt-Dubakella soil, occurring on approximately 977 acres, contains 30% serpentine derived soil, which is susceptible to slumping on slopes greater than 35%.

Surface Water and Peak Flows

The Williams and Deer Creek watersheds have a Mediterranean climate with cool, wet winters and warm dry summers. Precipitation in the Deer-Willy project area is highly variable with the climate becoming much drier as one proceeded from west to east across the project area. Precipitation ranges from approximately 32 inches in the northeastern portion to 64 inches in the northwestern portion. Above 4,000 feet, snow accumulates for 3 to 4 months a year, usually melting by April or early May. Since the majority of the Williams Watershed is located within the transient snow zone elevation, rapid snow melt and/or rain on snow events occur frequently. The lack of late season snow pack yields low to intermittent baseflows. In addition, because of the steep topography, water moves very efficiently through the watershed into the main streams.

Surface waters have been fully appropriated in the Deer Creek Watershed. Exacerbating the effects of surface water diversions on baseflows are groundwater withdrawals for domestic and irrigation use. In these instances, ground water is removed that would have flowed subsurface, discharging into streams.

Although peak flow events are normally considered climatically controlled, these 6th field watersheds have a considerable amount of area at 2,500 to 4,500 feet that is referred to as "transient snow zone" (TSZ) (Table 7). Furthermore, almost the entire project area is within the TSZ. The transient snow zone is an area in a watershed where precipitation frequently falls as

snow but then melts a few days or weeks later. The TSZ can cause flooding if heavy rain and warm temperatures occur simultaneously after snow has accumulated ("rain on snow" events). Management activities or natural disturbance events exacerbate these “rain-on-snow” events when there is an increase in the acres of natural openings.

Moore, et al. (2005) did not find any direct relationship between peak flow change and the percentage of basin area cut or basal area removed. The magnitude of peak flow increases declined with increasing event magnitude in most cases, with the greatest increases typically associated with autumn rain events on relatively dry catchments. These events resulted in small peak flows with little hydraulic consequence (Moore et al. 2005). In the steep gradient cascade and step-pool type streams, peak flow increases would have no affect on stream channels, as the flows critical for initiating morphological change are far beyond five-year events (Grant et al. 1990).

Peak flows of record such as the 1964 and 1974 flood events resulted from rain on snow events. The winter of 1995 demonstrated a 5 to 10 year flood event in this watershed because of rain falling on a moderate snow pack. This peak flow event caused East and West forks of Williams Creek to breach its channel depositing sediments into the narrow flood plains.

Table 7. Percentage of Analysis Areas within the Transient Snow Zone

Analysis Area (acres)	Acres by Precipitation Zone			Percent in Transient Snow Zone
	Rainfall Zone	Transient Snow Zone	Snow Zone	
Upper Deer Creek (14,358)	2,623	11,735	0.0	81.7
West Fork Williams Creek (21,100)	8,296	12,804	0.0	60.7
East Fork Williams Creek (11,219)	5,235	5,984	0.0	53.3
Lower Williams Creek (20,666)	14,673	5,993	0.0	28.9

Stream Channel

The Williams Watershed consists of steep (45-70%) mountainous slopes surrounding a relatively flat valley bottom. Most of the streams are Rosgen classification A3a+, which indicates that they are steep, narrow, entrenched channels with predominantly cobble substrate. This is the result of rapid flowing water carrying away the gravel, sand, and clay components. Class B1 and B2 streams occur at the toe slopes of the mountains where the stream gradient lowers. In these areas, the channel widens with some smaller floodplain sideslopes but maintains a moderate width/depth ratio. These channels are also moderately entrenched with stable banks (USDI 1996). Most BLM streams are located in narrow floodplains or canyons. (Table 8)

Roads, agriculture and development have appreciably altered Deer Creek and Williams Creek (USDI 2000). Loss of floodplains and riparian vegetation in combination with large flood events (1964, 1974, and 1997) led to accelerated erosion. The condition of the riparian zone on federal

lands varies from intact late-successional stands in parts of the upper portions of the watershed to narrow bands of hardwoods.

Past stream cleaning and timber harvest activities reduced the occurrence of large woody material (LWM) in streambeds and eliminated the potential for future LWM by removing some conifers in the riparian zones. Recruitment of LWM in stream channels in the near future is low. Large woody material provides nutrients to riparian areas and streams, nutrients for terrestrial and aquatic insects, habitat, shade, and food for fish.

Table 8. Stream miles, by type, in the Deer-Willy project area

Stream Name	Perennial	Intermittent	Ephemeral	Total
S Fork Deer Cr	2.5	5.3	1.6	9.4
Williams	14.6	26.5	6.0	47.1
East Fork Williams	15.6	9.5	2.5	25.6
West Fork Williams	34.2	55.8	7.3	97.3

Roads

The three primary effects of roads on hydrologic processes are: (1) intercept rainfall directly on the road surface and road cutbanks and affect subsurface water moving down the hillslope; (2) concentrate flow, either on the surface or in an adjacent ditch or channel; and (3) divert or reroute water from paths it otherwise would take were the road not present (Gucinski et al. 2001). Roads connected to stream channels through ditch lines effectively extend the stream channel network, changing runoff timing and ultimately increasing the magnitude of peak flows (Wemple et al. 1996). The effect of roads on peak streamflows depends strongly on the size of the watershed; for example, capture and rerouting of water can remove water from one small stream while causing major channel adjustments in another stream receiving the additional water (Gucinski et al. 2001). Roads have relatively insignificant effects on peak flow in large watersheds where they constitute a small proportion of the land surface (Gucinski et al. 2001).

Roads on sloping ground intercept surface and subsurface water, routing it to a draw or other natural drainage way within the stream system. This routing of water may increase the magnitude of flows and alter the timing of runoff. This process causes drainage water to reach streams more quickly than the natural rate. Increasing road densities in a watershed will generally be more likely to show increases in peak stream flow. The average road density in the Deer-Willy project area is 7.35 mi/mi^2 (Table 9).

Table 9. Area of roads and percent of sub-watershed in early seral condition by 6th Field Watershed

Watershed Name 6th field	Miles (Equivalent acres)	Percent of Watershed	Road Density (mi/sq. mi)	Percent in Early Seral Condition*
Upper Deer Cr	190.1 Miles (456)	3.18	8.48	26
W Fork Williams Cr	334.43 miles (802)	3.80	10.14	27
E Fork Williams Cr	117.24 miles (285)	2.54	6.78	19
Lower Williams Cr	129.65 miles (311)	1.51	4.01	5.3

* Stands 30 years old and younger. Percent in project area only.

Water Quality

The BLM, in cooperation with the Forest Service, ODEQ, and the Environmental Protection Agency, is implementing the *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters* (USDA and USDI 1999). Under the Protocol, the BLM will protect and maintain water quality where standards are met or surpassed, and restore water quality limited waterbodies within their jurisdiction to conditions that meet or surpass standards for designated beneficial uses. The BLM will also adhere to the State Anti-degradation Policy (OAR 2005; 340-041-0004) under any proposed actions.

The fish, amphibians, and invertebrates that are native to this watershed require abundant cool, non-polluted water. The domestic and organic agriculture users require abundant non-polluted water, and the conventional agricultural users require abundant water.[1]

The Oregon Department of Environmental Quality (ODEQ) listed South Fork Deer Creek, Williams Creek, East Fork Williams Creek, West Fork Williams Creek, Powell Creek, Bill Creek and Rock Creek on the water quality limited list from Section 303(d) of the Clean Water Act (Table 10; Appendix G) for elevated stream temperatures. Stream temperatures in these watersheds were elevated for following reasons: reduction in stream shade through the removal of riparian vegetation from logging, settlement, and road building; water withdrawal for irrigation and domestic use during the summer low flow period; simplified channels with high width/depth ratios from the removal of large wood from streams; large areas of stream scoured to bedrock due to the removal of large wood; and past mining in stream channels. These human disturbances, along with natural causes such as climate and geology, have resulted in stream temperatures above the ODEQ summer standard of a maximum of 64°F. Riparian Reserve implementation would maintain or reduce water temperatures of perennial streams (USDI 1994).

Throughout the upper Williams Creek watershed, existing shade ranged from 71-94% and DEQ identified a range of 35-88 years to reach recovery (DEQ, 1999).

[1] Non-polluted water is defined as water meeting or exceeding the State of Oregon water quality standards. Cool water is water less than 60° F as this is optimal fish habitat. Abundant water is having enough water to provide for habitat, domestic use, and agricultural purposes.

Table 10. Water Quality Assessment 2004/2006 (ODEQ)*

Creek Name	Temperature	Sediment	Flow Modification	pH	Dissolved Oxygen	Phosphate/ Phosphorus	Alkalinity	Ammonia	Chloride	Aquatic Weeds/Algae
S. Fork Deer Cr.	X			X						
Williams Creek	X									
E. Fork Williams Creek	X	X	X		X					X
W. Fork Williams Creek	X	X	X	X	X	X	X	X	X	
Powell Creek	X			X	X	X	X	X	X	
Bill Creek	X									
Rock Creek	X									

* See Appendix G for details

Environmental Consequences

Table 11 provides a synopsis of effects of both the No Action alternative and Alternative 2.

Table 11. Comparison of Effects on Soils from All Alternatives

Issue: Soil Condition	
Alternative 1 (No Action)	Alternative 2
No Action. All existing and future planned activities will continue.	Tractor log approximately 1,188 acres. Cable log approximately 531 acres. Maintain 173.46 road miles.
Effects	
No fuels treatments will occur and the risk of catastrophic fire will increase. There would be no additional compaction.	Continuation of compacted soil on tractor and cable logging corridors Reduction of catastrophic wildfire risk and density dependent mortality. Temporary increase in sediment production from road maintenance followed by re-armoring of road prism and long-term reduction in sediment production

Alternative 1: No Action
The existing watershed condition is the result of past actions and natural events that have occurred in the Deer Creek and Williams Creek 6th field watersheds. Past actions have resulted in watershed conditions such as elevated stream temperatures, fine sediment above background levels, reduced flow and simplified stream channels. Timber harvest and road building are the main actions that have caused these conditions. Other contributors include mining and urban / rural settlements, although the latter tends to occur lower in the watersheds. Urbanization and commercial logging are expected to continue throughout the private and lower portions of the watersheds.

Under the No Action Alternative, no forest management or restoration projects would occur and current conditions and trends will continue. Under this alternative, there would be no direct effects from ground disturbance on water quality or quantity based on BLM actions. It is understood that the private and non-BLM government agencies would perform actions that would change the landscape.

Minimal fuel treatments would take place and current overstocked conditions could result in a high severity burn if a fire occurred. High severity burns damage soils by removing the entire duff layer. Often, the intensity changes the soil structure. Severe fire can cause changes in successional rates, alter species composition, volatilize nutrients, produce rapid or decreased mineralization rates, and alter Carbon: Nitrogen ratios, resulting in subsequent nutrient losses through accelerated erosion, leaching or denitrification. In addition, changes in soil hydrologic functioning, degradation of soil physical properties, decreases in micro- and macrofauna, and alterations in microbial populations and associated processes can occur (Scott and Van Wyk, 1990; Neary, *et al*, 1999). High intensity fires in the riparian zone would greatly decrease stream shade and large wood recruitment potential. This condition would persist but gradually improve over the ensuing 60+ years. Low-impact burning can promote herbaceous flora, increase available nutrients, and thin over crowded forests.

Alternative 2: Proposed Action
Activities proposed would meet the Clean Water Act by applying PDFs (sections 2.3.1 – 2.3.3) and BMP's listed in Appendix D of the ROD/RMP (USDI 1995, p.151-178).

Approximately 4,562 acres of strategic roadside (within 200 feet of roads) and ridgeline treatments encompassing natural fuels in the WUI would be treated under this action alternative. Tractor and cable yarding are the two harvest methods the BLM is proposing to use in this project. Approximately 3,386 acres of ground based extraction and 645 acres of cable based extraction are proposed in all vegetation treatments (i.e. commercial, non-commercial, riparian and LSR). For slopes less than 35%, mechanized, low ground pressure machinery would cut, skid, haul or chip biomass. On slopes over 35%, biomass would be cable yarded. Ground based methods would utilize existing skid trails whenever possible. When this is not possible, we will require the designation of skids trails, spaced approximately 75 feet apart.

All POC trees less than 20" DBH would be eliminated from a zone of up to 50 feet on either side of identified roads in the project area. The relative amount of POC within this buffer zone is generally less than 10% of the total tree cover, with a highly variable pattern of establishment.

Periodic, low intensity underburns following initial fuel reduction would maintain desired fuel conditions. Maintenance burning throughout the project area would need to be done about every 7-15 years in areas classified as fire regime 1 and every 10-30 years for areas in fire regime 3.

Under Alternative 2, there will be 173.5 miles of road maintenance proposed under all action alternatives. The BLM and DEQ have signed a Memorandum of Agreement, which holds the BLM responsible to protect, restore and maintain water quality. PDF's (see section 2.3.1 – 2.3.3) would not permit wet season logging and hauling depending on weather, road surface, drainage and soil moisture. Furthermore, roads that route surface flow to streams will be improved. Ditch maintenance would occur where improperly functioning ditches are currently routing water onto the road. Ditch clearing would not occur within 50-100 feet of stream crossings, and in most situations would not occur between the last relief culvert and stream crossings. Skid roads would be water barred as needed for slope and soil type and only used during the dry season. Any skid roads in a riparian reserve used over several seasons will be winterized.

We expect a short term input of sediment to stream channels from the 173.5 miles of road maintenance proposed under the action alternative. Sediment production from forest roads declines substantially with time. A study of 74 road segments with road surfaces graded in western Oregon found 70% recovery by the second year and 90% recovery by the third year (Luce and Black 2001). Road maintenance would reduce sedimentation in the long term, benefiting water quality and reversing increases in overall sedimentation from past activities. Maintaining distance between ditch clearings and the crossing reduces potential delivery of sediment to the channel system because the armoring layer is not broken and vegetation in the ditch acts as a filter. The recovery from ditch blading occurs rapidly during the first three years in an exponential pattern (Luce and Black, 2001). The short term inputs from maintenance may create isolated pockets of fine sediment deposition immediately below culverts (5-100 feet). During high flows, the introduced sediment will become an immeasurable fraction of the system sediment load; it would not be detectable at downstream locations. A long term reduction in sedimentation and improved flow routing would be expected following road drainage improvement and decommissioning planned in the project.

Temporary spur roads, skid trail crossings and road maintenance would incrementally add fine sediment to the channel network. However, during typical winter peak flows, which initiate suspended and bedload sediment transport, the activity generated sediment would be inconsequential. Excluding commercial harvest from Riparian Reserves prevents disturbance to stream channels during the felling and yarding operations. The estimated erosion rate under the California Forest Practice Rules was about one-tenth of that estimated for an adjacent tributary of Redwood Creek as a result of timber operations utilized before 1976 (Best et al, 1995). California's rules are similar to the PDF's that the BLM uses when designing and implementing timber harvest plans. Periodic grading is important for maintaining the roadbed and preventing the formation of ruts, which can increase the road erosion rate by concentrating overland flow. However, grading also breaks up the armor layer and increases the loose sediment availability on the road, temporarily increasing the erosion rate. The lower portion of the 39-6-13 road has not been maintained and has substantial rutting as erosion that can access Bill Creek and its

tributaries. Megahan (1974) found that the decline in sediment yield after grading follows an exponential decay curve similar to that which occurs after road construction so that yields in the second and third years are typically many times lower than in the first year. All temporary spur roads would be constructed and obliterated in the dry season. Temporary roads would be winterized by installing water bars or water dips, seeding, mulching and surfacing the road. Roads would be replanted after obliteration.

Tractor and cable yarding are the two harvest methods the BLM is proposing to use in this project. Generally, tractor causes the most ground disturbance, followed by cable. Increased erosion and subsequent sedimentation is possible with ground-disturbing activities such as tractor yarding. Tractor yarding causes ground disturbance by removing vegetation and duff, thereby exposing soils to rainfall and subsequent erosion. Tractor yarding also physically displaces soils, resulting in potential erosion and subsequent off-site sedimentation. A buffer width of 100-200 feet is sufficient to prevent most sediment from reaching streams (A.C. Kindig and Cedarock 2003). For POC removal there will be no stream buffer, but the diameter limit and the yarding PDF's will limit potential sediment sources. The affect on streamside shade and bank stability is minor because of the diameter restrictions and the minority role that POC plays in the stands of the Deer Willy project.

Cable and ground based skid trail construction would result in a theoretical maximum of 38 acres of compacted trails. However, this would most likely be lower because of site specific opportunities that would allow for roadside access, rather than new trail construction, and the reuse of un-recovered skid trails. Cable yarding corridors, if sufficiently compacted, may route surface water and sediment into streams. However, high levels of residual slash left on the yarding corridors would reduce runoff by deflecting and redistributing overland flow laterally to areas where it would infiltrate into the soil. Limbs, tops, and brush would be scattered on the site and yarding corridors would be grass seeded where necessary to prevent erosion and aid infiltration. Yarding equipment would be restricted to existing roads to reduce soil compaction, and yarding and hauling would be restricted to periods of low precipitation and soil moisture.

Mass failure is the primary process that transports soils from hill slopes to stream channels, which can result if the shear stress acting on the material exceeds its shear strength (Swanston 1974). Roots can help stabilize slopes by anchoring a weak soil mass to fractures in bedrock, by crossing zones of weakness to more stable soil, and by providing long fibrous binders within a weak soil mass. Slope instability would likely develop following treatments on steep slopes, where the binding action of roots aids soil strength. It may take 15 years before new forest growth provides 50% of the root reinforcement supplied by the original forest, and 26 years to regain its full original strength (Ziemer 1981). Limiting the amount of tree removal on steep slopes (see PDF section 2.3.1), and reach into the stand from the road will be leave residual root strength greater than in the Ziemer study.

Cumulative Effects and Summary
While turbidity may increase under certain conditions in the first year following activity, there would be no alterations to channel form (width to depth ratios, pool reduction, embeddedness) or to channel processes (floodplain connectivity, stream flow velocity, pool and bar formations). Erosion rarely occurs uniformly in a forested watershed because surface erosion depends primarily on extent and continuity of bare areas; soil loss is usually slight. Longer term sedimentation is not expected due to site rehabilitation (i.e.: skid trail decommissioning, ditch cleaning, etc.) and ceasing of log truck traffic immediately following harvest. The channels would maintain themselves regardless of activity. There would be no alteration to sedimentation processes, which would create chronic adverse water quality or channel conditions.

Implementation of the action alternative would not reduce streamside shade within any stream reach and the project would not reduce large wood recruitment potential because standard stream buffers and reserves would be utilized. The affect on streamside shade and bank stability is minor because of the diameter restrictions and the minority role that POC plays in the stands of the Deer-Willy project. Since there would be no reduction in streamside shade, the project would not cause an increase in water temperature, thus complying with the state of Oregon's anti-degradation policy for the water bodies in the project planning area listed as water-quality limited for stream temperature. Tree growth rates would increase in response to density reduction decreasing the time required to achieve stand structure with potential to deliver large instream wood. Potential erosion from riparian disturbances would be minimized, short term, and not result in stream channel modification. Erosion rarely occurs uniformly in a forested watershed because surface erosion depends primarily on extent and continuity of bare areas; soil loss is usually slight.

At the 6th field watershed level, there is a low risk of changes in peak flow due to harvest in the TSZ because the project is thinning only and there would be no openings created. Research (Beschta et al. 2000; Harr et al. 1979; Harr et al. 1975; Jones 2000, Thomas and Megahan 1998, Ziemer 1981) has found that consistent detectable changes to stream flow from timber harvest occurred only when greater than 25% of the watershed was in clear-cut condition. We expect thinning to have a much reduced influence on the streamflow regime compared to clearcutting. Rapid expansion of root systems and crowns of trees left after partial cutting or thinning would be expected to quickly reduce any changes in streamflow (Rothacher 1971).

3.5 Fisheries / Aquatic

Affected Environment
The project area is in the Williams Creek and Deer Creek 5th field watersheds. The major fish bearing streams within the project area are Powell Creek, Mungers Creek, West Fork Williams Creek, Bill Creek, Swamp Creek, and South Fork Deer Creek. Fish in these streams include fall chinook salmon, coho salmon, winter and summer steelhead, cutthroat trout, Pacific lamprey, and sculpin. Southern Oregon/Northern California (SONC) coho salmon are federally listed as threatened.

The streams and riparian areas within the project area are described in the Deer Creek (USDI 1997) and Williams (USDI 1996) Watershed Analyses and Williams Creek Watershed Assessment (WCWC 2000) as degraded for fish habitat due to the effects of historic and current land use practices (e.g., placer mining, and straightening of channels for agriculture and road construction, reduction of instream wood through timber harvest). The Oregon Department of Fish and Wildlife (ODFW) has identified fish habitat benchmarks (Moore 1997) used to determine if a component of fish habitat is a limiting factor in trout or salmon production or survival. In the streams of the project area, lack of large woody debris (LWD), pool depth and frequency, water flow and temperature, and sedimentation have been identified as limiting for salmon and trout production and survival. The ODFW benchmark for pool habitat is that pools comprise >35% of total stream area, adequate riparian canopy is identified as coverage >70%, and LWD as >20 pieces of large wood per 100 meters of stream. Summer water temperatures are higher than optimal levels for salmonids in South Fork Deer Creek, Williams Creek, West Fork Williams Creek, Powell Creek, and Bill Creek. Instream water availability is below historic ranges.

Environmental Consequences

The following analysis considers the likelihood that the no action and the proposed action alternative would affect fisheries and aquatic resources, and then assesses the potential magnitude, duration, and nature of effects. The proposed actions are evaluated on how they would change fish habitat, and for this reason, the fisheries analysis is linked closely to the soil and water effects analysis (Soil and Water section 3.4). The effects on habitat are in turn used to evaluate the potential of the proposed actions to affect fish populations through production and survival.

Alternative 1: No Action

Current conditions and trends of channel processes and water quality, and therefore fish habitat, would continue. Currently, the fish-bearing streams of the project area have poor quality rearing habitat which limits salmonid growth and survival, as stated above in the description of affected environment. On BLM lands, sedimentation in spawning gravels is generally not a limiting factor for production and survival because most streams are located in narrow floodplains or canyons. Although sedimentation is not a limiting factor, programmatic road maintenance would continue contributing to reducing sediment sources. However, the improvements proposed in the action alternative that would alleviate chronic sediment sources would not occur.

Alternative 1 would have no direct effect on summer stream temperatures. However, the increased risk under this alternative of having a high severity wildfire in the riparian zone and the loss of infected Port Orford Cedar without management of root disease could indirectly affect stream temperatures. The loss of large areas of stream shade from fire or from POC mortality where it dominates the canopy would be likely to cause increases in stream temperatures. Fish growth and survival are limited by elevated stream temperatures in South Fork Deer Creek, Williams Creek, West Fork Williams Creek, Powell Creek, and Bill Creek.

The loss of future LWD recruitment potential from a high severity wildfire and POC extirpation in the riparian area would result in decreasing pool frequency and depth, decreased stream complexity, and decreased salmonid growth and survival through reduced rearing habitat quality.

Fish-bearing streams with inadequate levels of instream wood would continue to have low pool frequency and depth, little stream complexity, high stream velocities, and excessive bank erosion.

Alternative 2: Proposed Action

Road Work

The proposed road work includes maintenance and renovation. Road maintenance would reduce chronic sources of sediment through improved road drainage. Road maintenance and construction have the potential to cause small inputs of fine sediments to streams immediately downstream of culverts, but the size and effects on fish would be so greatly reduced by implementation of PDFs (wet season restrictions, dust abatement, etc.) that these actions are not likely to alter fish habitat. This is because the amount of sediment delivery would be so small as to not cause an increase in stream gravel embeddedness or deterioration in pool formation or quality.

Through PDFs and practices which minimize potential sediment routing to streams, activity-generated sediment in fish habitat would be undetectable. Salmonid survival and production would not alter because, as stated in the Soil and Water section (3.4) there would be no alterations to channel form (width to depth ratios, pool reduction, embeddedness) or channel processes (floodplain connectivity, stream flow velocity, pool and bar formations). There would be no alteration to sedimentation processes which would create chronic adverse water quality or channel conditions. Salmonid life stages (spawning, incubation, rearing) which depend on these channel conditions would not be negatively affected.

Level 1 and 2 Fuel Treatments

Approximately 4,571 acres of strategic roadside (within 200 feet of roads) and ridgeline treatments encompassing natural fuels in the WUI would be treated under this action alternative. Two levels of fuel hazard reduction intensity have been determined to achieve the identified project objectives. The primary difference between the levels is the age of the stand and the corresponding thinning prescription. More aggressive spacing of the young stands in the Level 2 areas would reduce competition between leave trees and increase tree vigor.

The riparian reserves of both perennial and intermittent streams are proposed for treatment. Fuel treatment prescriptions in the riparian reserve were developed to be consistent with objectives for ecosystem function that are outlined in the Aquatic Conservation Strategy of the Northwest Forest Plan (ACS). There would be no reduction in streamside shade or large instream wood recruitment because only smaller diameter trees would be cut, and the larger ones that provide the shaded canopy in the reserves and the best recruits for future large wood would be left in place. Hydrologic analysis (section 3.4) did not identify any impacts to channels which would result from fuel treatments either within or outside of Riparian Reserves.

Riparian reserve treatments would eventually result in late-successional forest conditions with increased structural diversity, canopy, and large woody debris recruitment, and improved stream complexity and water quality. This would occur at a faster rate than under the No Action alternative. Salmonid production would increase as channel function improves, resulting in increased adult holding areas and improved gravel retention. Improved rearing habitat resulting from increased stream complexity would increase juvenile survival.

PDFs would minimize the potential to negatively affect fish and aquatic habitat. Tractors would only operate in riparian areas that have slopes <35%, and logs would be lined to designated skid trails, which would be decompacted following use. Cable yarding would not be expected to result in erosive runoff. Treatments in riparian reserves would not reduce canopy cover below 50%, with the overall long term target of 60-70%. Vegetation in the primary shade zone of perennial streams would be retained because of the 50' no treatment area next to the channel (with the exception of removal of POC <20" DBH). The use of these PDFs in treatments conducted in riparian reserves would protect water quality by maintaining the shade necessary to avoid raising water temperatures in the stream segments passing through BLM lands, and by avoiding the creation of new sediment sources.

Activity and natural fuels would be treated in the riparian reserves of perennial and intermittent streams in order to reduce the fuel hazard and risk of severe wildfire as described in the No Action alternative (also see Fuels analysis Section 3.1). Fuel treatments include handpiling / burning, slashing, and underburning. Mechanical treatments and prescribed burning in riparian reserves would occur outside of no treatment zones.

Small woody material would be consumed during prescribed burning, but LWD would remain largely intact. The low intensity prescribed fires have a very low risk of mortality to large overstory trees or the consumption of snags. Therefore, future recruitment of LWD and streamside shade would not be reduced due to prescribed fire in the riparian reserve. Hand piles would not be burned within 50' of stream channels. Although these piles burn down to mineral soil, sediment would not migrate beyond the unburned litter around the pile. Following underburning, potential for sediment and ash transport to fish habitat is low because of the unburned strip of vegetation and organics along streams and the mosaic pattern of unburned vegetation outside the no treatment zone; therefore, no sediment routing mechanisms would be created. The potential for sediment transport resulting from these burns would coincide with intense rainfall and high winter flows and would not be distinguishable from baseline sediment loads. There would be no changes to the channel environment that would adversely affect fish or fish habitat.

Cumulative Effects

The potential effects described above are negligible in this alternative because of the efforts to eliminate sediment delivery mechanisms and disturbance through PDFs. Riparian functions of streamshade and large wood recruitment would be maintained and/or improved. There would be no increase in peak flows, no increase in erosion due to compaction, and no alterations in channel form or processes (see Soil and Water analysis Section 3.4). Therefore, there would be no measurable changes to aquatic habitat or fish at the 6th or 5th field watershed scales.

There are no additional reasonably foreseeable actions on BLM land in the watershed except the BLM fuel hazard reduction projects being completed under the CE authority.

Private lands are assumed to continue to be harvested on a rotation schedule in accordance with ODF guidelines. No cumulative effects were identified in the analysis of impacts to soil and water (See Section 3.4). Therefore, no cumulative effects to fish and aquatic habitats would be

expected to result from the proposed action in this project area, or 6th or 5th field watershed scales.

In conclusion, based on this analysis of potential impacts, the proposed actions would not be likely to disrupt normal behavior patterns such as migration, spawning, egg incubation, rearing and feeding. Habitat would not be degraded. The habitat would be expected to improve as late-successional forest develops in the Riparian Reserves at a faster pace than would occur under the No Action alternative.

Aquatic Conservation Strategy (ACS)
The Aquatic Conservation Strategy developed and identified nine objectives to maintain and restore the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The strategy is designed to protect salmon and steelhead habitat on federal lands managed by the BLM within the range of the Pacific Ocean anadromy. The components of the ACS are *riparian reserves, key watersheds, watershed analysis, and watershed restoration* (RMP p. 22).

Riparian Reserves
Riparian reserve widths conform to the interim widths prescribed in the Northwest Forest Plan (p. C-20). Fish bearing streams would have a riparian reserve width of 330 feet (2 site potential tree heights), perennial and intermittent streams and springs would have riparian reserve widths of 165 feet (1 site potential tree height). A 50 foot no treatment buffer would be applied to all perennial streams, all fish bearing streams and to all springs (with the exception of POC removal).

Key Watersheds
The project is not within a key watershed (RMP p. 23).

Watershed Analysis
The actions proposed in the Deer Willy Fuel Hazard Reduction Project EA occur within the Williams Creek and Deer Creek 5th field watersheds, analyzed in the Deer Creek (USDI 1997) and Williams (USDI 1996) Watershed Analyses and Williams Creek Watershed Assessment (WCWC 2000). The actions proposed are consistent with the recommendations of the Watershed Analyses.

Watershed Restoration
Riparian reserve treatments are proposed for riparian areas that exhibit high density, poor crown ratios, and poor conifer seedling regeneration. Treatment would maintain or restore the species composition and structural diversity of plant communities, supporting riparian-dependent species. Anticipated instream benefits would restore channel complexity, promote long-term ecological integrity in the watershed and conserve the genetic integrity of native species. The physical integrity of the aquatic system is expected to improve with increased channel roughness and reduced water velocities.

Based on the review of project effects at both the site and watershed scales and the nine ACS objectives, the Deer Willy Fuel Hazard Reduction Project is consistent with the Aquatic Conservation Strategy (RMP EIS p. 2-5).

3.6 Botanical Resources

3.6.1 Affected Environment

The project area was surveyed for federally listed (T&E) plant species, Bureau Special Status (BSS) plant species, and Oregon State listed (STO) species during the 2006-2008 field seasons. Additional surveys are still needed and will be completed before the decision record is signed. If new plant sites are found during surveys these plant sites will be protected using project design features. Effects to those sites will be analyzed prior to the decision record being signed. Surveys documented 13 sites of 5 species of listed plants in the project area (Table 12, Table 13). The project area is in the range of the federally listed species *Fritillaria gentneri* and it is partially in the range of *Lomatium cookii*; however, *F. gentneri* and *L. cookii* were not found in the project area. Surveys were also conducted for former Survey and Manage (S&M) category A and C species. Species were removed from the Survey and Manage list under the 2004 Record of Decision entitled "To Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines in Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl." However, a January 9, 2006 Court Order in Northwest Ecosystem Alliance et al. v. Mark Rey et al. resulted in the reinstatement of the Survey and Manage Standards and Guidelines (2001), including any amendments or modifications to the 2001 ROD that were in effect as of March 21, 2004. As a result of this ruling, S&M requirements for botanical species were placed back in effect in the Grants Pass Resource Area (GPRA) during the time this project was being designed. In 2007, the BLM and USFS prepared the 2007 Final Supplement to the 2004 FSEIS to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (Final Supplement). The resulting July 2007 ROD once again removed Survey and Manage mitigation requirements. However, since this change occurred during the development of this EA, the Grants Pass Field manager has elected to complete pre-disturbance surveys for former Survey and Manage species consistent with the 2001 Survey and Manage Record of Decision, and the subsequent annual species reviews, and to design the project as if these species were still managed as S&M species.

Table 12. Botanical Survey Findings				
Species	**Habitat**	**Protection Status**	**Populations in Project Area**	**Known Populations on the District**
VASCULAR PLANTS				
Cypripedium fasciculatum (Clustered ladyslipper)	Moist microsites in mixed evergreen forests.	Former Survey and Manage Category C/ Bureau Sensitive	5	1,012
Cypripedium montanum (Mountain ladyslipper)	Moist microsites in mixed evergreen forests.	Bureau Tracking	1	547
NON-VASCULAR PLANTS				
Fabronia pusilla (Fabronia Moss)	Rock outcrops in mature mixed conifer stands	Bureau Tracking	2	207
Chaenotheca ferruginea (Needle Lichen)	Found on bark or litter in mature conifer/hardwood forests.	Bureau Tracking	4	254

Special Status Species

Threatened and Endangered (T&E), State Threatened (STO), and Bureau Sensitive plants are required to be protected and managed. On July 26, 2007 a new Special Status Species list went into affect (IM No. OR-2007-072). This new list has two categories, Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking no longer exist. Sensitive species require a pre-project clearance and management to prevent them from trending toward federal listing. There is no pre-project clearance or management required for the Strategic Species at the BLM District level, thus Strategic Species will not be analyzed in this document.

Threatened and Endangered (T&E), State Threatened (STO), and Bureau Sensitive botanical species require protection and management. It is the BLM Oregon State Office's policy that the BLM would protect, manage, and conserve those sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR-1991-57 and IM OR-2003-054).

Surveys have not been conducted for Bureau Sensitive fungi, which is consistent with the BLM Oregon State Office Information Bulletin # OR-2004-145, Attachment 5. Above-ground fruiting structures (sporocarps) are short-lived, seasonal, and annually variable making surveys impractical (USDA, USDI 2000). Field surveys to determine occupancy of a site are not required for species where the surveys are considered to be impractical. Protection of known

sites along with on-going large scale inventory work would provide the measures and means to meet agency policy.

There are 20 Sensitive fungi species that are suspected or documented on lands administered by Medford District BLM. For these 20 fungi species, specific information regarding connectivity, range, habitat requirements, and response to disturbance are lacking. The NWFP, RMP, and technical information contained in the 2004 S&M FSEIS (USDA, USDI 2004, as cited in USDA, USDI 2007) acknowledge incomplete or unavailable information regarding these species. Given the broad habitat and the lack of surveys completed for these species, it is assumed that more sites exist in the area of the NWFP. It is unknown how rare these species really are, but it is known they are associated with common tree species (Table 13). We acknowledge that information regarding connectivity is uncertain, and habitat needs, range and the association between these species and late-successional conditions is not well understood. Therefore, there is uncertainty in the effects assessment.

Table 13 summarizes the known information regarding 10 of the 20 fungi. The 10 fungi not on the list were recently added to the Sensitive species list. As species are added after initiation of the project they will not be analyzed as sensitive species for this project. Table 13 also shows the number of sites in the NWFP area and whether insufficiencies were due to federal actions. Outcomes not due to federal actions could include: 1) limited potential habitat and few populations on federally managed lands; 2) potential for stochastic events; 3) low number of individuals; 4) limited distribution; and 5) very limited environmental conditions within which they can survive (USDA, USDI 2004). The table also displays forest communities where these species may be found. The fifth column summarizes the likelihood of occurrence in the Medford District, which can assist in conservation planning (USDA/USDI Interagency Special Status and Sensitive Species program website).

Table 13: Sensitive Fungi Habitat Sufficiency, Location, and Forest Community Components in the Medford District

Scientific Name	Sites in NWFP[1]	Sites in Reserves[2] (%)	Forest Community Component	Likelihood of Occurrence and Risk to Species Due to Federal Activities	Known Sites in the Deer Willy Project Area
Boletus pulcherrimus	36	5 (14%)	PSME, PIPO, ABCO	Low likelihood of occurrence; low risk to species viability	None
Dermocybe humboldtensis	4	1 (25%)	PSME, PIPO	Low likelihood of occurrence; low risk to species viability	None
Gastroboletus vividus	4	2 (50%)	ABCO, Pine	Low likelihood of occurrence; low risk to species	None

Scientific Name	Sites in NWFP[1]	Sites in Reserves[2] (%)	Forest Community Component	Likelihood of Occurrence and Risk to Species Due to Federal Activities	Known Sites in the Deer Willy Project Area
				viability	
Ramaria spinulosa var. diminutiva	1	0	PSME, Pine	Low likelihood of occurrence; low risk to species viability	None
Rhizopogon chamaleontinus	1	0	PSME	Reasonable likelihood of occurrence; low risk to species viability	None
Rhizopogon ellipsosporus	3	0	PSME	Reasonable likelihood of occurrence; low risk to species viability	None
Rhizopogon exiguus	5	3 (60%)	PSME	Reasonable likelihood of occurrence; low risk to species viability	None
Phaeocollybia californica	30	5 (17%)	PSME	Reasonable likelihood of occurrence; low risk to species viability	None
Phaeocollybia olivacea	93	19 (20%)	PSME, ABCO, QUKE, Pine	Reasonable likelihood of occurrence; low risk to species viability	1
Phaeocollybia oregonensis	11	5 (46%)	ABCO	Low likelihood of occurrence; low risk to species viability	None

[1] Source: ISMS database November 20, 2004, Handbook to Strategy 1 Fungal Species in the NWFP, Handbook to Additional Fungal Species of Special Concern in the NWFP, Medford District data.
[2] Reserves = Land Use Allocations, such as Late Successional Reserve and Congressionally Reserved areas.
Bold species = occurs on or within Medford District.
Acronyms: PSME = Douglas-fir, forest community component; PIPO = Ponderosa pine, forest community component, ABCO = White fir, forest community component; QUKE = California black oak, forest community component; Pine = Pinaceae family (includes pine, fir, Douglas-fir, spruce, hemlock), forest community component.

Noxious Weeds

Noxious weeds are non-native aggressive plants brought to North America either accidentally or intentionally. These species out-compete our native species for water, nutrients, and light crowding out and reducing populations of native species. Noxious weeds degrade recreation areas, increase fire risk, reduce forest health, decrease habitat for wildlife, invade cropland/pastures, and decrease availability of livestock forage. Certain species are potentially toxic to humans and other animals. Noxious weeds can out-compete native plants, reducing habitat for native insects and animals, and threaten biological diversity. They can alter soil fertility, dry up water supplies and decrease agriculture production. Seeds can remain viable for many years and many have extensive root systems which can re-sprout even after the tops of plants have been removed, making early detection and rapid response critical. Detecting noxious weed sites early and rapidly treating them decreases the chance for new populations becoming established, and increases the chance to eradicate noxious weed species from the area. Noxious weeds have no natural predators since their native habitat is outside the U.S. which makes it very difficult to control these species. Noxious weeds are primarily found in disturbed areas, often along roads and trails.

During surveys for federally listed plant species, Bureau Special Status plant species, former Survey and Manage species and Oregon State listed species; the project area was also surveyed for noxious weeds during the 2006-2008 field seasons. Additional surveys are still needed and will be completed before the decision record is signed. If new noxious weed populations are found during surveys, these plant sites will be documented. Effects to those sites will be assessed prior to the decision record being signed; if any substantial changes to effects from those disclosed below are found, they will also be disclosed in appropriate NEPA documentation. Surveys documented 11 occurrences for five species of noxious weeds in the project area (Table 14).

Vehicles are a primary method for transporting noxious weeds and creating new populations of noxious weeds. Road maintenance, new and temporary road construction, tractor harvest, trails and landing construction present a potential risk for seed dispersal of noxious weeds from outside the project area as well as the spread of existing seed within the project area.

Table 14. Noxious Weeds Survey Findings

Species	Common Name	Species Code	Designation	Section
Centaurea debeauxii	Meadow Knapweed	CEDE5	B	37S-07W
Cirsium arvense	CanadaThistle	CIAR4	B	39S-06W-03
Cirsium vulgare	Bull Thistle	CIVU	B	38S-06W-24, 27; 39S-06W-03
Hypericum perforatum	St. Johnswort	HYPE	B	38S-06W-13; 38S-06W-23; 38S-06W-27; 39S-06W-03
Rubus discolor	Himalayan Blackberry	RUAR9	B	39S-06W-03

3.6.2 Environmental Consequences

The only botanical species identified as an issue of potential concern that are found in the project area are depicted in the tables above (Tables 12 and 13). The list of species includes Threatened and Endangered (T&E), State Threatened (STO), and Bureau Special Status plants that law or policies require be protected and managed. It is Oregon State Office's policy that the Bureau of Land management would protect, manage, and conserve those sensitive species and their habitats such that any Bureau action would not contribute to the need to list any of these species (IM OR 1991-57). We are also including in this analysis species that had been under the former Survey and Manage (S&M) provision of the Resource Management Plan before it was eliminated in a plan amendment in 2007.

Alternative 1 – No Action

S&M, STO, T&E, AND BSS

Land ownership in the project area includes a checkerboard of government and privately owned land. As human populations and development increase in this region, available habitat for native botanical species would decrease. Management and treatment activities would continue to occur on private lands where there are no laws or regulations to govern management of listed species. Plant species on federal lands would continue to be protected and conserved following policy and management guidelines. Populations on non-federal lands would most likely remain undetected and unprotected because there are no laws governing rare plants on non-federal lands.

Fuel Hazard Reduction

Fire has played an extremely important role in influencing the plant communities of southwestern Oregon. The mixed evergreen forests and shrublands typically found in Josephine County and in this project area have been created and perpetuated in the past by fire. This regime has been disrupted by fire control activities (Franklin and Dyrness 1988). Suppression of fire in the watershed is another limiting factor that has brought on a decline of habitat for *Cypripedium* species. These plants are adapted to low intensity fires that reduce competition in the herbaceous vegetation layer. The rhizomatous roots of the species are deep enough in the ground to survive low intensity fires. However, it has been found that they will not survive high intensity fires (Lichthardt 2001). Without treatment, a build-up of fuels would continue to occur within the plant populations or suitable habitat. This build-up would create conditions making higher intensity wildfires more likely, which could result in extensive damage to habitat. Studies suggest that the most detrimental long term effect to *Cypripedium fasciculatum* from fire is the loss of appropriate habitat (Lichthardt 2001). Although, there is no way to know when wildland fires will actually occur on the project area, we do know that at some point there will be a fire ignition, and without fuel reduction, when it does occur, it would likely cause severe effects on species in the project area.

Roads

The no action alternative would not result in direct effects to S&M, STO, T&E, or Bureau Sensitive Species since no actions will occur under this alternative.

Noxious Weeds

Current data for BLM lands along with verbal communication from other agencies, organizations, and communities in Josephine County has shown that noxious weeds have been found to occur throughout the county. The number of species and known specific locations have not been recorded for Josephine County, Grants Pass Resource Area, and non-BLM land in the project area. Therefore BLM can only act on the assumption that 1) there is a source of noxious weeds on adjacent non-federal lands that can spread to federal lands, especially when the land ownership is checkerboard as within the watershed; or 2) conversely, in considering effects of BLM action on adjacent non-federal lands that noxious weeds are not already established in these lands. Under either assumption, there is an equal need to reduce the risk of spread of noxious weeds from the federal lands to the adjoining non-federal lands and *vice versa*. Seeds are spread by the wind, animal / avian vectors, natural events, and human activities. Additional human disturbance and traffic would increase the potential for spreading noxious weeds, but regardless of human activity, spread of these weeds would continue through natural forces. Thus, the BLM cannot stop the spread of noxious weeds to and from non-federal lands; it could only reduce the risk or rate of spread and control of known populations.

Adopting the No Action Alternative would not create additional disturbance or access that may result in new weed populations. Current populations of noxious weeds would be listed as lower priority for treatment due to alternative treatments not occurring in those specified units. Without treatment, existing populations will continue to increase in size and possibly spread to uninfected areas through vectors such as, wind, wildlife, water and unauthorized trail building and OHV use.

Port-Orford Cedar

The no action alternative would not result in direct effects to S&M, STO, T&E, or Bureau Sensitive Species since no actions will occur under this alternative.

Alternative 2 – Effects to the Action

Fuel Hazard Reduction

State listed and T&E species have not been found in the project area to date, therefore there would be no direct or indirect effects to these species. However, additional surveys are still needed and will be completed before the decision record is signed. If new plant sites are found during surveys these plant sites will be protected using project designed features. Effects to those sites will be analyzed prior to the decision record being signed. However, as new sites would also be protected with project design features, effects are expected to be the same. If effects are determined to be different than disclosed below, additional appropriate NEPA documentation will be provided to the public.

Fuels treatments would maintain botanical species habitat while reducing the likelihood of high severity wildfires. Underburning, burning slash and chipping material are treatments that replicate natural, low intensity burns on the landscape.

Hand pile and burning would occur when fuel loads are too high for underburning activities. Hand piles would be distributed across the landscape covering a maximum of 4,571 acres. Igniting hand piles produces a high intensity burn that exposes mineral soil and potentially has direct impacts on undiscovered individual plants that happen to be under the piles. For the project, an average of 70 hand piles per acre would be burned. Based on 7 foot x 7 foot hand pile spacing and 70 hand piles per acre, only 0.08% of the area would be covered by the handpiles. At the Deer Willy watershed scale, hand piles would occur on 0.0008% of the area. Piles burned are not fully consumed, reducing predicted disturbed acreage. Plant species of concern that may be affected by the hand piling and burning would have the opportunity to recover as adjacent populations re-populate burned areas. Specialist observations and research from previously treated areas have found that vegetation recovers in a burn pile area within a couple of years.

Approximately 3,386 acres of fuel hazard reduction are identified for potential biomass removal which would reduce hazardous fuels and benefit the local economy. To eliminate effects to botanical species or the spread of noxious weeds, PDFs would be followed (sections 2.3.1 and 2.3.4). Effects are similar to fuel reduction activities described above. However, there may be an additional 645 acres of soil disturbance due to designated skid trails. We do not expect biomass removal will adversely affect botanical species, because the PDFs would protect known sites, mitigate the effects and because of the small scale of the disturbance from the proposed action.

Some thinning or fuel reduction would occur in the fall, or during plant dormancy periods, which would reduce competition from encroaching species and improve habitat. Also, fuel hazard reduction treatments that thin the understory would help return forests to healthier conditions simulating disturbance of a more natural fire regime. This, in turn, would reduce the risk of high intensity fire, protecting botanical species. Certain species are stimulated by fire and would benefit from low intensity fire. Populations of *Solanum parishii* appear to respond positively to fire (Mullens and Showalter 2007). Studies suggest that the most detrimental long term effect to *Cypripedium fasciculatum* from fire is the loss of appropriate habitat (Lichthardt 2001).

If listed species are found within the treatment area buffers would be implemented to protect the species. Buffers surrounding all listed plant sites would provide protection from project activities. Buffer sizes would be implemented based on species, habitat, and treatment. Therefore, implementation would not contribute to the listing of vascular plants, non-vascular plants or fungi.

Roads

State listed and T&E species have not been found in the project area to date. However, additional surveys are still needed and will be completed before the decision record is signed. If new plant sites are found during surveys these plant sites will be protected using project designed features. Effects to those sites will be analyzed prior to the decision record being signed.

Alternative two is proposing 173.5 miles of road maintenance. The road maintenance will occur in the road prism. Disturbance occurs frequently within this area. If listed plant species are found within the treatment area buffers would be implemented to protect the species.

Due to project design features (PDFs) there would be no direct or indirect effects to existing S&M, STO, T&E, or Bureau Special Status botanical species (Chapter 2). Buffers surrounding all listed plant sites would provide protection from project activities. Buffer sizes would be based on species, habitat, and treatment. Implementation of this management treatment would not contribute to the listing of vascular plants, non-vascular plants or fungi.

Noxious Weeds

Noxious weeds have been slowly encroaching onto serpentine lands and throughout the project area, particularly along roadsides and other disturbed areas. Project design features would be implemented to prevent the spread of noxious weeds and to prevent new populations from becoming established (section 2.3.4). Monitoring and treatment are put in place if any noxious weeds are found in the project area. Treatment applications of noxious weeds would not affect listed species due to the methods of treatments which affect the noxious weed only.

Port-Orford Cedar

The treatment is proposed to occur within fifty feet of the road prism where disturbance and road maintenance occurs frequently. If listed species are found within the treatment area buffers would be implemented to protect the species. Due to project design features (PDFs) there would be no direct or indirect effects to existing former S&M, STO, T&E, or Bureau Special Status botanical species (section 2.3.4). Buffers surrounding all listed plant sites would provide protection from project activities. Buffer sizes would be based on species, habitat, and treatment. Implementation of the POC management treatment would not contribute to the listing of vascular plants, non-vascular plants or fungi.

Summary

The Deer Willy project incorporates PDF's and buffers for the protection of S&M, STO, T&E, and Bureau Special Status botanical species and habitat from project activities. These protection measures are also utilized for other projects on the Grants Pass Resource Area and throughout the Medford District. Due to these protection measures, listed species are protected from potential impacts and project activities, and will not trend towards extinction or extirpation. As there will be no project level effects, there will be no additional effects that would add to the existing level of effects, therefore, there are no cumulative effects from this project.

Noxious Weeds

Noxious weeds have started to impact plant communities, especially in drainages and along roadsides in the project area. Foreseeable activities in the project area are expected to be similar to past and current activities: motor vehicle traffic, recreations use, development, vegetation management, and road maintenance. These types of activities would result in new disturbed sites available for colonization by existing noxious weed populations, and they offer the possibility of introduction of new noxious weed species under any alternative, including the No Action alternative. Noxious weed sites found within the Deer Willy project area have been documented and mapped. Project design features have been put in place to minimize any potential impacts that noxious weeds would have from any action that may occur from this project. Given unpredictable vectors for weed spread, such as vehicle usage by private parties, wildlife, water, and wind currents, it is not possible to quantify with any degree of confidence the rate of weed spread in the future, or even the degree by which that potential would be increased by the

proposed actions. However, the proposed action, inclusive of PDFs, would minimize the spread of noxious weeds, and treatments would reduce existing weed populations. The BLM is working to increase communication and treatment opportunities with other land owners, agencies, and organizations through the Josephine County Cooperative Weed Management Area with the hope of increasing the effectiveness of treatments and a cumulative decrease in the spread of noxious weeds.

3.7 Wildlife

Affected Environment

Habitats within the project area include riparian, early seral forest, mid-seral forest, late-successional forest, rock outcrops/ talus, snags, and down wood. Chappell and Kagan (2001) describe upland habitats within southern Oregon as Southwest Oregon Mixed Conifer-Hardwood Forest; the stands in the project area fit within this description and are in various stages of stand development. The current conditions of the stands in the Deer Willy project area are discussed below and are related to different wildlife species associated with these various stages of stand development. Only federally listed and Bureau Sensitive species with habitat within the project area are addressed in this EA. Additional species groups such as land birds and big game are also addressed because they are present within the project area. See tables in Appendix E for an updated list of special status species known or suspected to occur within the Grants Pass Resource Area.

10. As required by the Endangered Species Act, consultation has been completed with the United States Fish and Wildlife Service (USFWS) regarding wildlife T&E listed species potentially impacted by the project. The USFWS agreed with the BLM's Biological Assessment that this project would result in a "May Affect, Not Likely to Adversely Affect" Northern Spotted Owls and has issued a Letter of Concurrence (Medford District BLM Biological Assessment and USFWS Letter of Concurrence (Log #1-15-06-I-165) (2007)).

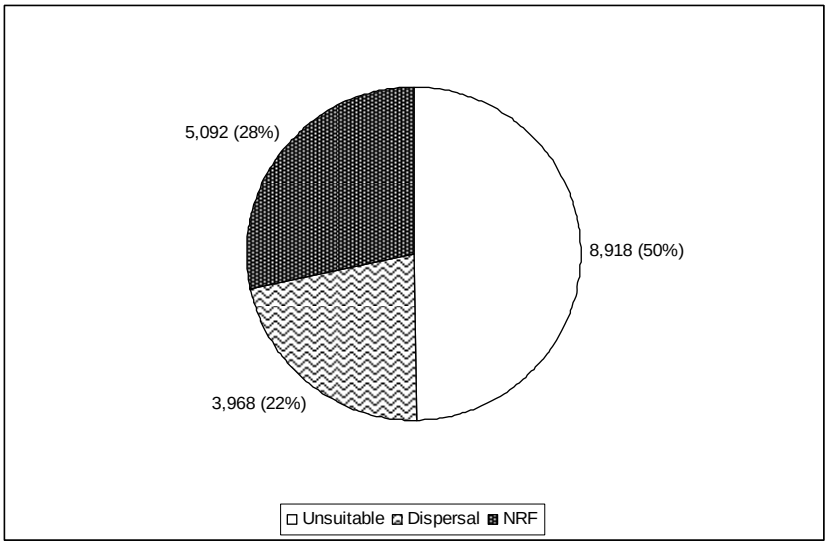
Northern Spotted Owl (Federally Threatened)

Northern spotted owls (*Strix occidentalis caurina*) are closely associated with old forests for nesting, foraging, and roosting throughout most of their range (Forsman et al. 1984; Carey et al. 1990; and Solis and Gutierrez 1990). Spotted owl habitat within the project area was typed utilizing the McKelvey rating system, a standard BLM methodology which has six levels of habitat classification (See Appendix E). Suitable spotted owl nesting, roosting, and foraging habitat (NRF) is classified as McKelvey ratings 1 and 2, which equates to late-successional forest habitat. NRF habitat is characterized by forested stands with older forest structure, multiple canopy layers, and a canopy closure of 60 percent or greater. The best quality NRF habitat has large old trees with cavities, broken tops or mistletoe platforms branches, dead standing and fallen decayed trees, and multiple canopies of shade tolerant hardwoods and conifers that support prey base. NRF habitat can also function as dispersal habitat. "Dispersal-only" habitat for spotted owls (McKelvey 5 and 6) is defined as stands that have a canopy closure of 40 percent or greater, and are open enough for flight and predator avoidance. Dispersal-only habitat is used throughout this document to refer to habitat that does not meet the criteria of NRF (nesting, roosting, or foraging) habitat, but has adequate cover to facilitate

movement between blocks of suitable NRF habitat. Unsuitable habitat does not currently meet the NRF or "dispersal only" habitat criteria.

The Deer Willy project area currently contains 5,092 acres (28%) of suitable NRF spotted owl habitat, 3,968 acres (22%) of dispersal only habitat and 8,918 acres (50%) of non-suitable habitat (Figure 1). There are 7 known historic spotted owl sites in the project area.

Figure 1: Owl Habitat within the Deer Willy Project Area



The entire Deer Willy project area is within the East IV/Williams-Deer LSR, which contains a mixture of Forest Service and BLM lands. Greater than 85 percent of this LSR is capable of growing spotted owl habitat (late-successional forest habitat) because of the plant and soil series. However, due to past harvest, fire suppression, and fires, not all of these lands are currently late-successional forest habitat. The project area is also in a designated spotted owl Critical Habitat Unit (CHU), OR-72. As a whole, CHU OR-72 provides very important east-west and north-south intra-provincial (Klamath Mountains Province) connectivity in an area of high fragmentation. The high fragmentation is a result of the geology, fire history, ownership patterns, and past management practices. (USDI USFWS 2003).

Spotted Owl Prey

Dusky-footed woodrats, the primary prey species for spotted owls in Southwest Oregon, are found in high densities in early seral or edge habitat (Sakai and Noon 1993, 1997). Down wood is also an important habitat feature for major prey species in southwest Oregon. Habitat surveys in the project area indicated high abundance of woodrat nests in stands proposed for treatment. Northern flying squirrels are another major source of owl prey in southwest Oregon, while red tree voles (RTV) comprises only 2.6 % of the diet of spotted owls in this area (Forsman et. al. 2004). Dusky-footed woodrats build stick nests, sometimes incorporating logs as part of the structure. They also may fortify hollow logs with sticks to use for dens. Other prey species, such as the western red-backed vole use sound logs for travel lanes and rotting logs for foraging,

nesting, or internal travel routes. Moisture in and under rotting logs is involved in production of fungi, which is the main food for northern flying squirrels and the western red-backed voles.

Fisher (Federal Candidate)

The Pacific fisher (*Martes pennanti*) was petitioned for listing as endangered or threatened under the Endangered Species Act on December 12, 2000. In 2003 the USFWS released their notice of 90-day petition finding and initiation of status review (68 Federal Register, No. 132, 41169-41174) and in 2004 published their Notice of 12-month petition finding, concluding that listing fishers as threatened was warranted, but was precluded by higher priority listing actions (Federal Register Vol. 69, No. 68, April 8, 2004, 18769-18792). The species remains a USFWS candidate species (USDI, USFWS 2004, 71 Fed. Reg. 53777, Sept. 12, 2006). In their 2006 update on the status of the Pacific fisher, the USFWS define the reasons for listing as: "Major threats that fragment or remove key elements of fisher habitat include various forest vegetation management practices such as timber harvest and fuels reduction treatments. Other potential major threats include: Stand-replacing fire, Sudden Oak Death, (*Phytophthora*), urban and rural development, recreation development, and highways." (71 Fed. Reg. 53777 (Sept. 12, 2006)). The USFWS also states that the three remaining fisher populations "appear to be stable or not rapidly declining based on recent survey and monitoring efforts." (Id.)

Fishers are closely associated with low to mid elevation (generally <4,000 feet) forests with a coniferous component, large snags, or decadent live trees and logs for denning and resting, and complex physical structure near the forest floor to support adequate prey populations (Aubry and Lewis 2003). Powell and Zielinski (1994) and Zielinski et al. (2004) suggest that habitat suitable for denning and resting sites may be more limiting for fishers than foraging habitat. Mckelvey habitat ratings 1 & 2 used above to describe suitable spotted owl NRF habitat also adequately describes suitable fisher denning and resting sites because there is a direct correlation of key habitat features captured in the rating system for fisher habitat (high canopy cover, multi-storied stands, large snags, and large down trees on the forest floor). Based on the McKelvey habitat analysis, approximately 5,092 acres of suitable fisher denning and resting habitat exists within the Deer Willy project area. However, all of these acres may not provide optimal fisher habitat because past harvest practices and land ownership patterns have fragmented this habitat within the project. BLM checkerboard ownership may be one of the primary factors limiting the ability of BLM lands to provide optimal habitat for fishers (USDA and USDI 1994b). This checkerboard ownership pattern was created by the Congressional acts that provided land grants, and is outside of BLM's control.

Forest carnivore surveys using bait stations with motion and infrared detection cameras have been conducted throughout the Grants Pass Resource Area and have detected fishers within the project area. Three sightings of fisher were detected within the project area; 1 in 1999 and 2 in 2001. It is important to note that while fishers were detected within the project area, and are likely resident animals, the "weight" of these detections should be considered cautiously because the animals were drawn to the camera stations by bait. The individual home range size of fishers commonly average from 15 to 20 km^2, and individuals have been documented moving large distances (5 – 6 km per day) over short time periods (Verts and Carrraway 1998). Given this expansive home range size and propensity for large movements, individual sightings are not a reliable indicator of habitat use or long term site occupancy.

Bald Eagle
On August 8, 2007, the USDI Fish and Wildlife Service removed (delisted) the Bald Eagle from the Federal List of Threatened and Endangered Wildlife (Federal Register Vol. 72, No. 130, July 9, 2007, 37346 -37372), but the species remains a Bureau Sensitive species.

In southwest Oregon, the majority of bald eagle nests are in large trees near lakes, rivers, and ponds. Eagles build their nests in large dominant over story trees, often at the edge of a stand or on a ridge. Nest trees have broken or deformed tops and/or large branches to support the nest. Potentially suitable bald eagle nesting habitat exists in the northern portion of the project area along the ridges closest to the Applegate River. There are no known bald eagle nests within the project area. The closest known nest is approximately 1 mile northeast of the project.

Bats
One Bureau Sensitive bat species associated with late-successional habitat is suspected to occur within the project area (fringed myotis). Four additional bat species (the silver-haired bat, long-eared myotis, long-legged myotis, and pallid bat) are listed in the NWFP as protection buffer species (USDA and USDI 1994a, b) and are also associated with older stands. Older forest stands receive greater use by bats due to the availability of roosts, a complex vertical structure and less clutter. Bats use live tree and snag cavities as well as rock crevices, mines, caves, stumps, loose bark, bridges, buildings, and other protected sites (Verts and Carraway 1998). Townsend's big-eared bats (Bureau Sensitive) hibernate in caves and mines during winter (Sherwin 1998). There are no known caves or abandoned mines, wooden bridges or buildings in the project area that would warrant management as an occupied bat site. However, due to the presence of suitable habitat, these species are likely found throughout the project area where suitable habitat exists.

Land Birds (Neotropical migrants and year round residents)
Land birds use a wide variety of habitats, including late-successional forests, riparian areas, brush in recovering clearcuts, and small trees in developing stands. Some birds, such as the Olive-sided Flycatcher, will perch on residual canopy trees and forage over clear cuts. Some of the 20 year old recovering clear cuts in Deer Willy with lower tree and shrub heights would provide these optimal foraging conditions. Many land birds are associated with deciduous shrubs and trees in early successional habitats (i.e. Orange Crowned Warblers and Rufous Hummingbirds).

All neotropical migrants go to Central or South America each year. They are addressed here due to widespread concern regarding downward population trends, habitat declines, and the BLM's efforts to comply with Executive Order 13186, the Migratory Bird Treaty Act. No migrants found on the Medford District BLM are listed as endangered or threatened but some are USFWS identified species of conservation concern (Federal Register July 10, 2003 Vol. 68, No. 25, 6179). Six of the birds on this list (Table 13) are known to occur on the Medford District BLM (USDI USFWS 2002) (Table 15). Neotropical birds, as a group, are not special status species.

Table 15: Birds of Conservation Concern for Medford District BLM	
Species	**Presence in the Deer Willy Project Area**
Peregrine Falcon	None known –may forage
Flammulated Owl	No Habitat
Olive-sided Flycatcher	Present
Rufous Hummingbird	Present
Lewis' Woodpecker	Seen in adjacent watersheds in the Fall
White-headed Woodpecker	Unknown

Resident birds remain in the same general area (e.g., the Pileated Woodpecker) or migrate to lower elevations in the winter (e.g., the Dark-eyed Junco). Total numbers of late-successional dependent migratory or resident birds within the Deer Willy project area are unknown; however, knowledge of specific numbers is not necessary to assess effects of land management activities on migratory or resident birds. Breeding bird surveys in the Southern Pacific Rainforest Physiographic Region (which includes western Oregon) indicate that songbirds are declining. However, the cause of these declines is still unclear, but is suspected to be an issue associated with their winter grounds (Sauer et al. 2004, Alexander 2005).

Big Game

The vast majority of project area (>90%) lies within an RMP designated elk management area. Management objectives within this area include enhancing elk habitat in a manner consistent with objectives of other allocations, such as managing for timber or old-growth, as well as enhancing connectivity (RMP, p. 48). The Medford District RMP management guidelines also include: limiting motorized vehicle use to an open road density of 1.5 miles per square mile, where possible; imposing seasonal restrictions on activities if needed to avoid disturbance and harassment; maintaining and enhancing forage where appropriate by creating small openings in conifer stands of all ages, prescribed burning, seeding, fertilizing, underburing forest stands, or other management; and managing the mix of forage areas, thermal cover, hiding cover, and optimal cover to attain or maintain highly viable habitat conditions.

Foraging conditions are declining within the project area due to the dense young stand conditions, decadent brush, and few grassy openings. Elk are present in the project area, but current population numbers are unknown (Vargus 2006). Elk are historically known in the drainage. Other game species, such as deer, cougar, and bear are known to occur within the project area. Oregon Department of Fish and Wildlife has currently identified the Applegate / Williams area as an "elk de-emphasis area" due to the increased damage complaints (Vargus 2006). Because of the close proximity of the low elevation agricultural lands to this big game management area, the ODFWs current management direction for this area is to avoid activities that will bring elk into the area because the potential for elk to damage fences, graze the pastures, reducing forage for livestock and damage hay stacks.

Alternative 1: No Action

Under Alternative 1, no proposed activities would occur. The current successional development trend of stands toward late-successional habitat under Alternative 1 is uncertain. In southwest Oregon the reduction in fire frequency from historic frequencies has reduced the role of fire as an ecological factor influencing stand development, and altering historic forest structures, processes and functions.

Wildfire would remain the most immediate hazard to the existing late-successional habitat that is currently present within the project area (Courtney et. al. 2004). Fuel loading and ladder fuel conditions make the existing late-successional habitat susceptible to potential high severity fire, the results of which would remove or downgrade habitat randomly across the landscape, setting back succession and development, and likely resulting in the loss of large tree structure, coarse woody material, and remnant/legacy forest components critical to late-successional forest habitat dependent species.

Under the no action alternative, the majority of stands within the project area would remain over stocked, resulting in slowed growth rates, successional stagnation, and increased fuel loading. Late-successional forest habitat dependent species would be negatively affected under the no action alternative because the current stand conditions work to increase the potential for the loss of suitable habitat through stand replacing fires. Specifically, the greatest risk of no action is the wildfire related loss of large live remnant conifers, snags, down wood, and hardwoods that are important to late-successional forest dependent species. However, some wildlife species that favor dense conditions (i.e. some neotropical birds, woodrats) may benefit from the no action alternative because the dense understories would continue to build within the project area. The increased chance of fires as a result of no action, could also lead to the loss and decline of these dense habitat conditions as well.

Alternative 2: Proposed Action

Effects from Vegetation Treatments

GENERAL HABITAT EFFECTS

Late-Successional Forest Habitat

No adverse effects to late-successional habitat are anticipated as a result of the proposed action because the proposed treatments would only remove small diameter materials (<12" DBH) in existing late-successional habitat. Furthermore, in places where level 1 FHR treatments overlap with existing late-successional habitat, only a small portion of the stand would receive treatment (generally 200' from roads). In the long term, the existing late-successional forest habitat would increase and fragmentation would decrease within the project area. The effects from the action alternatives would be common to late-successional dependent species, such as the Northern Spotted Owl, Red Tree Vole, Northern Goshawks, bats, and Pileated Woodpeckers. The effects to late-successional habitat would be minimal under the proposed action, because the proposed action would not substantially alter the structure or the canopy cover of the existing late-successional habitat.

Level 1 Treatments

Under the action alternative, approximately 3,694 acres of level 1 fuel hazard reduction (FHR) is proposed. This treatment would provide for increased fire resiliency of the existing stands by reducing fuel loading and ladder fuels near probable points of ignition. These treatments would not alter the stand conditions from one habitat condition to another in terms of overstory structure, but will reduce understory densities and fuel loads. Taken as a whole, the proposed level 1 treatments would reduce the probability of a large scale fire developing within the project

area. These treatments would therefore reduce the likelihood of the loss of existing high quality late-successional habitat and those species that rely on this type of forest structure during their life cycle.

Level 2 Treatments

The 877 acres of level 2 FHR proposed under alternative 2 would contribute to moving previously managed stands in the project area towards late-successional forest habitat and would have long term beneficial effects to late-successional associated species. The long term beneficial effects include accelerated development of large tree structure, creation of gaps to promote stand diversity, and accelerated development of multiple canopy layers. Additionally, proposed treatments would reduce fuel loads built up within the drainage and help protect the existing late-successional forest habitat within the project area by creating more fire resilient stands.

Short term negative effects are expected to previously managed stands due to thinning of the vegetation (see species sections below for more detail). However, the long term benefits to late-successional forest associated species outweigh these short term impacts and would not lessen the short term functionality of the East-IV/Williams-Deer LSR or CHU OR-72 as a whole.

Port-Orford Cedar Sanitation

This treatment proposes the removal of all POC <20" DBH within 50 feet of designated road systems. This treatment overlaps with the vast majority of either the level 1 or level 2 FHR treatment areas, and only approximately 24 acres of stand alone POC sanitation would occur under the action alternative. Although this prescription calls for the complete removal of all POC trees <20" DBH, no stands of pure POC exist in the project area. Therefore, the expected results from this treatment to wildlife habitat is anticipated to be relatively minor. Within the 12 acres of NRF habitat where this treatment is proposed, overall canopy cover is expected to remain above 60%. This treatment type should result in a similar suite of effects comparable to those produced from the level 2 FHR treatments.

SPECIES EFECTS

Northern Spotted Owl

The actions proposed under alternative 2 would not substantially alter any existing suitable spotted owl habitat. All of the components that contribute to the functionality of spotted owl habitat (canopy cover, large diameter trees, snags, etc.) would not be removed or degraded below critical thresholds during project implementation. All of the proposed actions under alternative 2 would not change any of the existing habitats from one McKelvey classifications to another. These treatments are all considered "treat and maintain" treatments, as further described in the FY 08 BA/ LOC - Log # 1-15-06-I-165, September 2007. Forty-nine percent of all the proposed treatments would occur in unsuitable habitat (2,244 acres). Twenty-seven percent of all treatments would occur in dispersal only habitat (1,230 acres), and 24% would occur in NRF habitat (1,096 acres) (Table 16).

Table 16. Acres of Proposed Treatments within Spotted Owl Habitat

Treatment Type	Unsuitable	Dispersal	NRF	Total
Level 1 FHR	1,361	1,230	1,085	3,676
Level 2 FHR	871	0	0	871
POC Sanitation Only	12	0	12	24
Total	**2,244**	**1,230**	**1,096**	**4,571**

The proposed actions under alternative 2 would not significantly alter any spotted owl habitat. Some minor short term impacts to spotted owl prey species may occur, but even these anticipated effects would not occur across the landscape and a large amount of habitat (13,417 ac., or 74% of the project area) would remain untreated after project implementation, thus further reducing the negative effects to NSO prey. Alternative 2 would produce long term benefits to NSO's by 1) reducing the likelihood of stand replacing fire events, thus increasing the probability that the existing high-quality NSO habitat within the project area remains functional, and 2) promoting the development of future late-successional forest habitat within treatment areas faster than if left untreated.

There would be no disturbance effects to spotted owls from project activities because of seasonal restrictions identified as Project Design Features in Chapter 2 (section 2.3.2). This protection would prohibit disturbance during the breeding season and would avoid any negative effects to reproduction from disturbance.

Effects to Spotted Owl Prey Species

Treatments may cause short term impacts to spotted owl prey species due to the disturbance to understory plants and below ground fungi through tree removal and surface disturbance. There may be short term impacts on truffle production, flying squirrel abundance, and owl foraging, but habitat and prey populations recover more quickly with these prescriptions compared to more aggressive treatments (i.e. thinning, regeneration harvest). Additionally, not all of the project would be treated at once, which would provide untreated areas available for spotted owl foraging, making these short term effects unlikely to affect spotted owl foraging. Over the long term, these density reduction treatments would increase tree growth, crown differentiation, understory development, and understory plants' flowering and fruiting (Buermeyer and Harrington 2002, Wender et al. 2004), which provide ancillary foods to spotted owl prey. Leave patches in treatment areas would be targeted around large woodrat nest locations to minimize the decline of this important prey species within the drainage.

Effects to the East IV/Williams-Deer LSR and Critical Habitat Unit OR-72

The proposed treatments that would occur within the LSR/CHU under this project would maintain the NRF and dispersal-only habitat in suitable condition for the owls. These treatments are considered "treat and maintain" because the key habitat characteristics (canopy cover, large coarse wood, etc.) would remain after project implementation. Long term beneficial effects to the LSR/CHU from these treatments would be expected in two ways: 1) these treatments are designed to reduce the severity and rate of spread of large, stand-replacing fires capable of removing suitable spotted owl habitat (USDI 2006); and 2) the stands proposed for level 2 FHR treatment would likely develop into suitable late-successional habitat at a faster rate than if left untreated.

Fisher
The project would not impact fisher denning and resting habitat because the proposed treatments would not alter late-successional forest habitat or the habitat features important to fishers (large trees, large snags, and large coarse woody material (CWM)). Additionally, in areas where level 2 FHR treatments are proposed, additional CWM would be retained to meet the levels targeted in the Project Design Features in Chapter 2, thus improving the habitat quality in these stands. The proposed thinning and fuels treatments would have short term negative effects to fisher prey species (squirrels, rabbits, mice, voles, etc.) by reducing prey forage due to removal of understory plants and the loss of below ground fungi. These effects are relatively short term; the understory typically re-vegetates within 5 years and the overstory canopy often regains 60% closure within 10-15 years. These short term effects to fisher prey species would be minimal because untreated areas would continue to provide forage habitat while canopy cover in the treated stands increases.

Project activity disturbance effects to fishers are not well known. Fishers may avoid roaded areas (Harris and Ogan 1997) and humans (Douglas and Strickland 1987; Powell 1993). Disturbance from project activities would be temporally and geographically limited and would occupy a geographic area smaller than the average fisher home range. Seasonal restrictions listed as Project Design Features for Spotted Owls, soil or other resources would also benefit fishers by restricting project activities until young are approximately six weeks old. Fishers have large home ranges and would be able to move away from the action area while the disturbance is occurring without impacting their ability to forage and disperse within their home range.

Alternative 2 would not contribute to the need to federally list the fisher as threatened or endangered because no known denning sites would be lost and no suitable denning and resting habitat within the project area would be removed. Habitat features, such as large snags and coarse woody material, would be retained throughout the project area, which would provide future habitat for denning and resting, and further reduce potential impacts. Fishers would not be precluded from dispersing or foraging in the project area because suitable habitat and key habitat features would be retained throughout the project area.

Bald Eagle
Alternative 2 would have no negative effects to the Bald Eagle or any existing Eagle habitat because it would not result in changes to potential existing roosting, nesting or perching trees and to foraging areas. Only fuels treatments are located on the ridges and the project would not remove suitable nesting trees on the ridges. There would be potential long term benefits by speeding up tree growth to provide future alternate nest trees for the nearby historic sites, as well as decrease the likelihood of the loss of potential nesting and roosting trees due to stand-replacement fire.

Land Birds (Neotropical migrants and year round residents)
Alternatives 2 would treat a variety of songbird habitats. Any action that changes or removes vegetation used by one species may benefit another. Some species that have been adversely affected by fire suppression and dense understory conditions would benefit from the reduction of stem densities and canopy cover. Species such as the Rufous Hummingbird which use nectar producing plants would benefit from the increase in forbs and flowering shrubs which would

occur post treatment. This increase would continue until the tree canopy recovers and shades out these plants. Species that have benefited from lack of fire and dense understories could be adversely affected by these treatments (Janes, 2003; Hagar et al. 2001; Siegel et al. 2003). Short term negative effects to forested stands for both action alternatives include reduced stem densities, ladder fuels and canopy closure. However, untreated areas within and adjacent to the treatment areas would provide refuge and nesting habitat which would help minimize seasonal disturbance and short term loss of habitat. Existing large diameter snags and down wood would be retained in the project area which would reduce the potential impacts to species dependent on these habitat structures for nesting, roosting, or foraging. Long term beneficial effects include accelerated development of large tree structure for interior forest species.

Some individuals may be lost or displaced during project activities, and there would be a shift in species because of habitat modifications. Adequate untreated areas in and adjacent to the project area would maintain habitat for displaced individuals. Overall, populations in the region would be unaffected due to this small amount of loss that would not be measurable at the regional scale. Partners in Flight supports the ecoregional scale as appropriate for analyzing bird populations (http://www.partnersinflight.org/description.cfm).

Big Game

Thinning young stands would accelerate the successional pattern toward more optimal thermal cover. Short term effects include an increase in understory forage due to an increase in resources such as light. In the long term, the stands would begin providing optimal thermal cover; however, as these young stands develop and canopy cover increases, forage would be limited to decommissioned skid roads, yarding landing sites, road sides, small gaps created in treatment units, as well as areas affected by future disturbances.

Activity in the area associated with the proposed project would have an adverse short term effect on elk due to disturbance. However, this potential disturbance would not be year round, but would only last during project activities. Elk would be able to move away from the noise because there are adequate amounts of hiding cover throughout the project area, Roads open to the public year round create the biggest disturbance concern to elk. The level 1 FHR treatments would in some cases increase the visibility along roadsides into the forested stands, and allow for the increased potential of poaching or illegal road hunting.

Summary of Effects

In summary, no late-successional forest habitat would be removed. Therefore, no spotted owl NRF habitat, fisher denning and resting habitat, or bald eagle nesting habitat would be removed. The proposed vegetation treatments would have long term beneficial effects to late-successional forest habitat by reducing the likelihood of stand replacing fire events or the loss of existing high value late-successional forest habitat, and accelerating the developmental trajectory of the previously managed stands within the project area. These long term benefits to late-successional forest associated species would outweigh the potential short term disturbance effects or impacts to prey species because more acres of late-successional forest habitat would be available within the project area in the future. The vegetation treatments proposed under alternative 2 would not contribute to the need to federally list any Bureau Sensitive species as threatened or endangered.

Disturbance due to project activities (thinning, burning, etc.) would be of short duration and could be spread throughout the year. This disturbance could cause temporary displacement and modified wildlife behavior during project implementation. However, potential disturbance to wildlife would be limited because the entire project area would not be treated at once. The disturbance would be short term temporally because operation restrictions and weather conditions would reduce the time period of the activities.

Cumulative Effects

Cumulative effects for wildlife species and habitat are discussed at the 5th field watershed level in order to capture the varying habitats, species home ranges, and varying degrees of species mobility. Cumulative effects in the project area result from the incremental impact of the alternatives, added to other past, present and reasonably foreseeable actions. Fire suppression, road building, and timber harvest throughout the project area have altered historic conditions. These past activities have resulted in habitat loss and fragmentation, and have changed the distribution and abundance of many wildlife species in the Williams Creek 5th field Watershed.

Habitat modification and removal with fewer protection measures would continue on private or county lands, which would negatively affect late-successional dependent wildlife species on these lands largely by reducing stand seral stage. Approximately 46% of the Williams Creek 5th field watershed is in non-federal ownership. It is expected that late-successional forest habitat dependent species would rely on, and be largely confined to federally owned lands within the Williams Creek 5th field watershed in the long term. There are no other ongoing or foreseeable actions on federal lands within the Williams Creek 5th field watershed. The Deer Willy project would not add negative cumulative effects to late-successional forest habitat associated species because the action alternative would not remove any late-successional forest habitat.

3.8 Cultural Resources

Affected Environment

The Deer Willy fire hazard reduction project is situated in a region with a rich history. Archeological evidence indicates that human occupation of southwest Oregon dates back about 10,000 years. The native inhabitants of the area were Takelma and Athapascan and are generalized as hunters and gatherers. Takelma people occupied most of the Rogue Valley and the Athapaskans occupied lands from the coast to the Applegate River and Galice Creek.

The first known whites to enter the Applegate watershed belonged to a party of Hudson's Bay Company trappers from Fort Vancouver who passed through the area in early 1827. Other trappers and explorers made periodic visits to the area up to the time of the discovery of gold in Jackson County which occurred in late 1851, or early 1852, which brought an influx of thousands of miners to the region.

Gold mining, primarily prospecting, occurred on a small scale within the Deer Creek watershed in the mid-1800's; the level of hydraulic gold mining was low in the watershed. No records of large scale gold mining operations were found for the Deer Creek watershed.

Historic mining districts within the Williams watershed are Powell Creek and Williams Creek (USDI 1996). In 1859 the town of Williamsburg, now Williams, was founded. Williamsburg was a typical small mining village with stores, hotels, saloons, etc. The post office was established in 1860, discontinued in 1861, and reestablished in 1881 when the town became Williams.

Over the past several decades gold mining has continued in various degrees in southwest Oregon. The mining of gold in the Williams area today involves some hard rock mining and some placer mining on a small scale. As of November 1994, there were approximately 55 placer and 55 hardrock claims located within the Williams Creek watershed.

The development of the timber resources for commercial purposes in southwestern Oregon began in the 1850's. The potential for timber industry was minimal in southern Oregon until after World War II due to lack of rail connections, techniques used in timber removal and adequate roads.

Cultural resources are susceptible to damage from a wide range of different actions including illegal digging, damage from OHV vehicles ripping up the soils and damaging or displacing artifacts, fire, encroachment of vegetation and vandalism.

Cultural Resources Inventory

Cultural resources are recognized as fragile, irreplaceable resources with potential public and scientific uses, representing an important and integral part of our Nation's heritage. The BLM manages cultural resources under its jurisdiction or control according to their relative importance, protecting against impairment, destruction, and inadvertent loss, and encouraging and accommodating the uses determined appropriate through planning and public participation (BLM Manual Section 8100.06A:2004).

Cultural resource inventories have been completed in the project area. Sites within the project area include landscapes representing the development of different mining technologies, camp sites associated with mining activities and timber removal, transportation routes and associated refuse scatters. No prehistoric sites have been recorded in the project area. The Deer Willy fire hazard reduction boundary encompasses several past BLM management related areas. Previous archaeological research in the project area includes two small surveys completed in 1997 and 2003, and two larger landscape level surveys done in 1997 and 1998 associated with timber sales. The total acreage previously surveyed under these other projects total 344 acres. During these previous surveys four cultural sites were recorded within the current Deer Willy project boundary. These sites are related to historic mining. The Deer Willy fuels hazard reduction project survey was completed in April 2008. The total new acreage surveyed was 759 acres, for a total of 1,103 acres. No new sites were recorded during the most recent cultural resource survey. No formal Determintation of Eligibility to the National Register has been completed for any of the recorded sites in the Deer Willy project area. Under the *Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon* (BLM Manual Section 8140, Appendix 1:1998). BLM may assume that a cultural resource or group of resources is eligible for the National Register of Historic Places rather than conduct a formal determination of eligibility. Therefore, all recorded sites within the Deer Willy fuels

hazard reduction project area are buffered with flagging and no project activities will occur within the flagged boundary.

All known cultural sites have been identified. Proposed treatments would occur near cultural resources. The minimum level of protection for sites is avoidance. Flagging is placed 20 feet outside the known site boundary, and project design features include falling timber away from site perimeters.

Areas cleared for firelines could provide opportunities for OHV riders to leave designated roads with their vehicles and gain access to cultural resource sites, possibly damaging them. To reduce the possibility of damage from OHV use, fireline construction would not be done within 100 feet of roadways until the project is implemented. Vegetation removal would be minimal for the first 100 feet, routing the fireline around existing vegetation where possible. Upon completion, vegetation would be pulled back over the first 100 feet of fireline. This will help discourage use by OHV users and help protect cultural resource sites.

Alternative 1: No Action
None of the proposed actions would be implemented in the Deer Willy fuel hazard reduction project. All environmental conditions and trends will continue. Fuels build-up would continue to increase and could result in a catastrophic fire which could threaten or destroy cultural resources. Vegetation would continue to encroach on cultural resources and could result in the damage and/or destruction of those resources through root disturbance, bioturbation and wind throw.

Alternative 2: Proposed Action
With the reduction of vegetation created by proposed management activities, potential indirect impacts on cultural resources may include sites becoming more susceptible to vandalism and looting because of increased visibility and access. Following the Protocol agreement between BLM and the State Historic Preservation Office (SHPO), recorded sites within the project area will be protected, using project design features including: flagging placed 20 feet beyond the known site boundary; no fire line construction, prescribed burning, or hand piling/burning would occur within the flagged boundaries of the recorded cultural resources; timber would be felled away from flagged cultural site perimeters; and if unrecorded cultural sites are found during project implementation, a cultural resource specialist would be informed and provide appropriate protection measures (see PDFs, Section 2.3.9). The cultural program utilizes post project monitoring of cultural sites in areas where projects have been completed. This monitoring has shown the methods used to protect cultural resources to be effective.

The vegetation management around these sites will afford additional protection of wooden features and artifacts associated with historic sites, reducing the risk from possible catastrophic fire. Due to inclusion and implementation of the project design features there would be no direct effects to cultural resources because the sites are buffered and no activities would occur within the protected area.

Cumulative Effects
Management direction includes protecting and managing the integrity of all historic / prehistoric sites identified in the cultural survey for this and other projects. Activities from the proposed action that might damage cultural resources include controlled burning, fuel hazard reduction, and illegal Off Highway Vehicle (OHV) use. Currently OHV use occurs within the project area. Fuels and harvest work on BLM would reduce understory vegetation, creating potential illegal / unauthorized uses (i.e. increased OHV use off designated roads and trails). Cultural sites have the potential to be impacted by illegal / unauthorized OHV use. Damage to cultural resources by OHV use is uncertain and depends on user responsibility and the degree to which they would actually access thinned stands.

However, as all cultural sites would be buffered with flagging from project activities for this and other projects, and PDFs will be implemented to minimize effects from potential OHV use and other ground disturbing activities, no cumulative impacts on cultural resources are anticipated. Monitoring of cultural sites after project implementation has shown these methods adequately protect the cultural sites from ground disturbance during project implementation.

3.9 Visual Resources Management

Affected Environment
The VRM classes in the project area are VRM III and VRM IV. Class III objectives are to manage lands for moderate levels of change to the characteristic landscape. Management activities may attract attention but should not dominate the view of the casual observer. Class IV objectives are to manage lands for high levels of change. Management activities may dominate the view and be the major focus of viewer attention. The characteristic landscape can be described as modified natural, with modifications ranging from residences in the area, flat agricultural land in the foregound, roads, fences and telephone poles. Private industry land surrounds and is interspersed with BLM land in the project area.

Vegetation in the vicinity of the project area (public and private land) varies from open areas / fields in the valley to young, mid and older forest stands on the slopes and ridges. The lowest slopes are often blocked by foreground vegetation on the valley floor. The middle ridges and background ridgelines are more visible due to the flat topography of the valley floor, which generally runs northeast to southwest, and curves back to the southeast at the south end of the project area.

<u>Key Observation Points</u>
Key Observation Points were established to identify potential effects to the visual resources. Key observation points were determined by following the most highly used commonly traveled routes in the project area and using topographic maps and photo documentation. These sites were chosen based on the following indicators, as recommended in the BLM's VRM Manual 8431: angle of observation, number of viewers, and length of time the project is in view. The angle of observation would be straight ahead, or looking left/right from the commonly traveled routes. Number of viewers would be considered high (i.e. state highway, interstate), medium (i.e. county road) and low (i.e. private road or BLM road). Length of time project is in view would be determined by the speed at which a vehicle is traveling on the road, and the view of the

area from the vehicle. Other indicators not as heavily weighed in determining KOPs were: relative project size, season of use, and light conditions.

Alternative 1: No Action
Without proposed treatments, there are events that could negatively change the visual appearance of the landscape. These include insect/disease spread which would appear as pockets of dead/dying trees and an increase in grays and browns. Also, without treatments along roads and ridges in the project area, there would be more fuel (from denser stands and dead/dying trees), increasing the chance for large, stand-replacing wildfires, causing an increase in browns. In places where these units are in view from Key Observation Points, a stand-replacing wildfire would dominate the view.

Alternative 2: Proposed Action
Effects of the proposed action on visual resources include short term increases in browns and light greens along roads and ridges where treatment is proposed. The texture of the vegetation will become slightly rougher as smaller diameter trees are removed. Vertical lines will be slightly more pronounced in the foreground views, as individual trees may stand out more. Both Level 1 and Level 2 treatments will meet VRM III and IV objectives because treatments will blend with the characteristic variable landscape. Treatments on the ridges will generally blend with existing vegetation, which is generally vertically dominated with some skyline visible through ridgeline vegetation.

Project design features such as feathering, irregular shapes, avoiding straight lines and screening will also aid in meeting VRM objectives.

Cumulative Effects
Cumulative effects of this project in the Williams watershed on visuals would be positive, as fuel reduction and POC sanitation would decrease chances for large-scale wildfires and disease spread, which could negatively impact the visuals. Previous BLM projects (in the 1960s, 1970s and 1980s), as well as projects on private land, have contributed to some negative visual images in the past. However, today's prescriptions blend with the characteristic landscape and include project design features such as feathering and screening, so that treatments are not noticed by the casual observer. Due to the prescription and project design features, the Deer Willy project will not contribute to additional negative visual impacts in the watershed.

4.0 AGENCIES AND PERSONS CONSULTED

4.1 Public Involvement
Public involvement for this project began in May 2007 when a scoping letter was sent to approximately 132 organizations, agencies, residents near the project area and others who have expressed an interest in this type of project on the Grants Pass Resource Area. Public meetings introducing the project were held in Merlin and Williams, in June and July 2007, respectively.

A second scoping letter was sent in February 2008 to approximately 92 organizations, agencies and individuals who expressed an interest in staying informed on the project. This letter outlined the proposed action and asked for further comment on the project. A second public meeting was

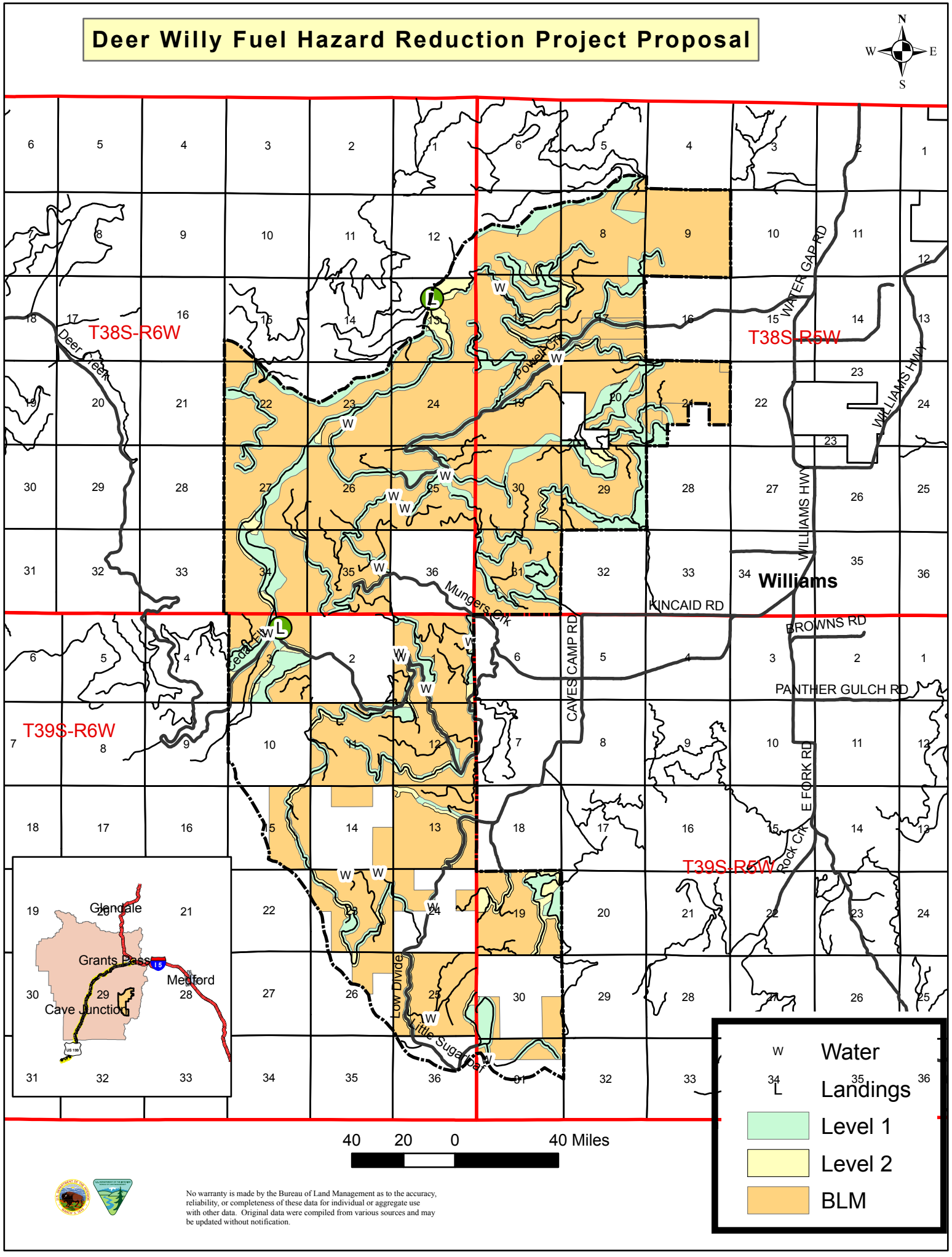
held in Williams on February 26, 2008 and a public field tour was conducted on March 14, 2008, which was attended by 13 individuals and representatives of organizations.

The following agencies were also consulted during the planning process: Josephine County, US Fish and Wildlife Service, National Marine Fisheries Service, and Oregon Department of Fish and Wildlife.

4.2 Availability of Document and Comment Procedures

Copies of the EA will be available for public review in the Grants Pass Interagency Office. A formal 30-day public comment period will be initiated by an announcement in the Grants Pass Daily Courier. If you would like a copy of the EA, please stop by the office or contact Allen Mitchell, project lead, at (541) 471-6635 or Tony Kerwin, Environmental Planner at (541) 471-6564. Written comments should be addressed to Abbie Jossie, Field Manager, Grants Pass Resource Area, at 2164 NE Spalding Avenue, Grants Pass, OR 97526. E-mailed comments may be sent to *Medford_Mail@blm.gov*.

Deer Willy Fuel Hazard Reduction Project Proposal

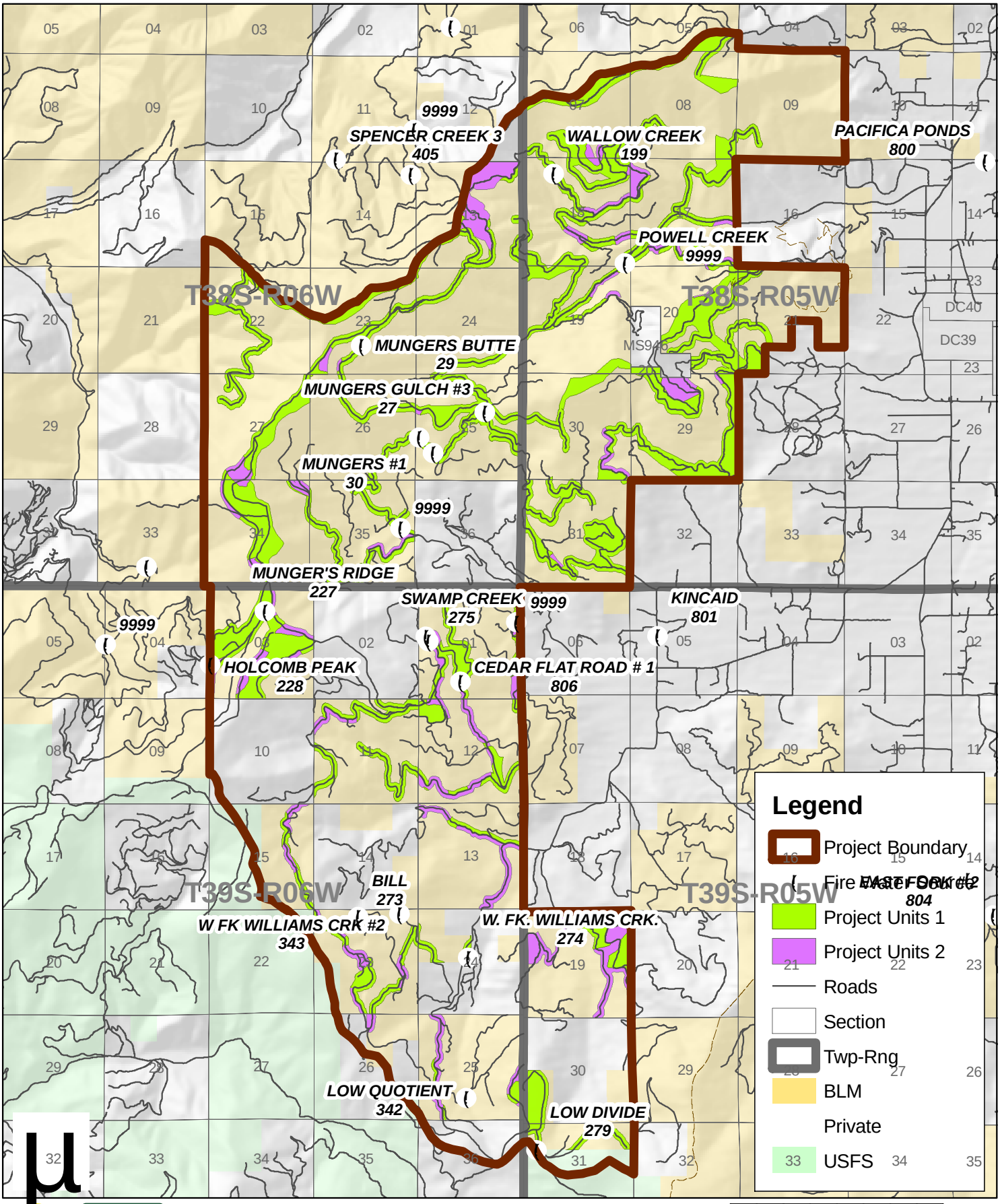


No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

Fire Water Sources*

DEER WILLY PROJECT AREA

*Not verified recently as to location, capacity, condition, etc



0 0.5 1 2 Miles

Mxd: D:\home\aparsons\arcmaps\DeerWilly20080206.mxd
Machine: ILMORMD40481671

Appendix B. Treatment Tables

Deer Willy Level 1 Treatment

Treatment	*Section*	*Treatment Acres*
Level 1	T38S-R5W-05	34
Level 1	T38S-R5W-07	150
Level 1	T38S-R5W-08	105
Level 1	T38S-R5W-09	17
Level 1	T38S-R5W-13	35
Level 1	T38S-R5W-17	162
Level 1	T38S-R5W-18	174
Level 1	T38S-R5W-19	122
Level 1	T38S-R5W-20	223
Level 1	T38S-R5W-21	78
Level 1	T38S-R5W-29	240
Level 1	T38S-R5W-30	104
Level 1	T38S-R5W-31	231
Level 1	T38S-R6W-13	89
Level 1	T38S-R6W-22	116
Level 1	T38S-R6W-23	125
Level 1	T38S-R6W-24	72
Level 1	T38S-R6W-25	189
Level 1	T38S-R6W-26	78
Level 1	T38S-R6W-27	121
Level 1	T38S-R6W-34	144
Level 1	T38S-R6W-35	141
Level 1	T39S-R5W-19	80
Level 1	T39S-R5W-30	66
Level 1	T39S-R5W-31	48
Level 1	T39S-R6W-01	141
Level 1	T39S-R6W-03	224

Treatment	*Section*	*Treatment Acres*
Level 1	T39S-R6W-11	134
Level 1	T39S-R6W-12	83
Level 1	T39S-R6W-13	20
Level 1	T39S-R6W-15	27
Level 1	T39S-R6W-23	75
Level 1	T39S-R6W-24	22
Level 1	T39S-R6W-25	24
	Total Acres =	**3.694**

Tuesday, June 24, 2008

Deer Willy Level 2 Treatment

Treatment	*Section*	*Treatment Acres*
Level 2	T38S-R5W-07	10
Level 2	T38S-R5W-17	45
Level 2	T38S-R5W-18	39
Level 2	T38S-R5W-19	15
Level 2	T38S-R5W-20	4
Level 2	T38S-R5W-29	39
Level 2	T38S-R5W-30	19
Level 2	T38S-R5W-31	3
Level 2	T38S-R6W-13	113
Level 2	T38S-R6W-23	10
Level 2	T38S-R6W-25	2
Level 2	T38S-R6W-27	20
Level 2	T38S-R6W-34	38
Level 2	T38S-R6W-35	16
Level 2	T39S-R5W-19	136
Level 2	T39S-R5W-30	2
Level 2	T39S-R6W-01	45
Level 2	T39S-R6W-03	60
Level 2	T39S-R6W-11	16
Level 2	T39S-R6W-12	62
Level 2	T39S-R6W-13	58
Level 2	T39S-R6W-15	21
Level 2	T39S-R6W-23	42
Level 2	T39S-R6W-25	53
Level 2	T39S-R6W-26	9
	Total Acres =	**877**

Tuesday, June 24, 2008

Deer Willy POC Treatment

Treatment	*Section*	*Treatment Acres*
POC treatment	T38S-R05W-17	31
POC treatment	T38S-R05W-18	3
POC treatment	T38S-R05W-19	24
POC treatment	T38S-R05W-20	1
POC treatment	T38S-R06W-24	11
POC treatment	T38S-R06W-25	23
POC treatment	T38S-R06W-26	9
POC treatment	T38S-R06W-35	35
POC treatment	T39S-R05W-07	1
POC treatment	T39S-R05W-19	46
POC treatment	T39S-R06W-01	51
POC treatment	T39S-R06W-11	37
POC treatment	T39S-R06W-12	34
POC treatment	T39S-R06W-13	24
POC treatment	T39S-R06W-23	33
POC treatment	T39S-R06W-24	6
POC treatment	T39S-R06W-25	32
POC treatment	T39S-R06W-26	2
	Total Acres =	**403**

EA Roads Table

					Approx. Miles of Proposed Treatement:						Miles of Road
RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	within Riparian
37 S 06 W 36.00A	Spencer Crk	1.16	BLM	Aggregate	1.16	0	0	0	OP		0.67
37 S 06 W 36.00B	Spencer Crk	0.42	BLM	Aggregate	0.42	0	0	0	OP		0.15
37 S 06 W 36.00C	Spencer Crk	0.4	Private	Aggregate	0.4	0	0	0	OP		
37 S 06 W 36.00D	Spencer Crk	1.07	BLM	Aggregate	1.07	0	0	0	OP		
37 S 06 W 36.00E1	Spencer Crk	1.37	BLM	Aggregate	1.37	0	0	0	OP		0
37 S 06 W 36.00E2	Spencer Crk	0.71	BLM	Aggregate	0.71	0	0	0	OP		0
37 S 06 W 36.00F	Spencer Crk	0.95	BLM	Aggregate	0.95	0	0	0	OP		0
37 S 06 W 36.00G	Spencer Crk	1.15	BLM	Pit Run	1.15	0	0	0	OP		0.07
37 S 06 W 36.00H	Spencer Crk	0.68	BLM	Pit Run	0.68	0	0	0	OP		
37 S 06 W 36.00I	Spencer Crk	2.89	BLM	Pit Run	2.89	0	0	0	OP		
37 S 06 W 36.00J	Spencer Crk	0.31	BLM	Pit Run	0.31	0	0	0	OP		
38 S 05 W 05.00	Grays Crk	0.36	BLM	Natural Unimproved	0.36	0	0	0	OP		
38 S 05 W 05.01	Grays Ck Sp A	2.81	BLM	Natural Unimproved	2.81	0	2.81	0	OP		
38 S 05 W 07.00	Honeysuckle D Sp	0.71	BLM	Natural Unimproved	0.71	0	0	0	ST	ADM	0.15
38 S 05 W 07.01	Honey Wallow A Sp	0.87	BLM	Natural Unimproved	0.87	0	0	0	ST	ADM	
38 S 05 W 15.00A	Powell Crk	0.53	BLM	Bituminous	0.53	0	0	0	OP		0
38 S 05 W 15.00B	Powell Crk	0.27	BLM	Bituminous	0.27	0	0	0	OP		0
38 S 05 W 15.00C	Powell Crk	1.04	BLM	Bituminous	1.04	0	0	0	OP		0
38 S 05 W 15.00D	Powell Crk	1.04	BLM	Bituminous	1.04	0	0	0	OP		1.15
38 S 05 W 15.00E	Powell Crk	0.38	BLM	Bituminous	0.38	0	0	0	OP		0.2
38 S 05 W 15.00F	Powell Crk	0.81	BLM	Bituminous	0.81	0	0	0	OP		0.83
38 S 05 W 15.00G	Powell Crk	0.66	BLM	Bituminous	0.66	0	0	0	OP		0.7
38 S 05 W 15.00H	Powell Crk	1.42	BLM	Bituminous	1.42	0	0	0	OP		1.25
38 S 05 W 15.00I	Powell Crk	0.75	BLM	Bituminous	0.75	0	0	0	OP		
38 S 05 W 15.00J	Powell Crk	1.5	BLM	Aggregate	1.5	0	0	0	OP		0.22
38 S 05 W 17.00A	Wallow Ck Ml	1.39	BLM	Grid Rolled	1.39	0	0	0	ST	POC	1.14
38 S 05 W 17.00B	Wallow Ck Ml	1.46	BLM	Grid Rolled	1.46	0	0	0	ST	POC	
38 S 05 W 17.00C	Wallow Ck Ml	1.58	BLM	Natural Unimproved	1.58	0	0	0	FD	POC	0.09
38 S 05 W 17.01	Slade Hl	2.43	BLM	Natural Unimproved	2.43	0	0	0	OP		0.38
38 S 05 W 17.02	Honeysuckle P Line	2.01	BLM	Pit Run	2.01	0	0	0	OP		0.42
38 S 05 W 17.03	Honeysuckle C Sp	1.04	BLM	Natural Unimproved	1.04	0	0	0	FD	POC	0.06
38 S 05 W 18.00A	Wallow Ck C Spur	0.27	BLM	Natural Unimproved	0.27	0	0	0	OP		0.05
38 S 05 W 18.00B	Wallow Ck C Spur	0.35	BLM	Natural Unimproved	0.35	0	0	0	OP		0.05
38 S 05 W 18.01	Powell Ck T S Sp	0.77	BLM	Pit Run	0.77	0	0	0	FD	POC	0.08
38 S 05 W 18.02	Wallow Ck Sp B	0.92	BLM	Pit Run	0.92	0	0	0	FD	POC	0.05

RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	Miles of Road within Riparian
38 S 05 W 18.03	Wallow Ck B	0.85	BLM	Natural Unimproved	0.85	0	0	0	OP		0.39
38 S 05 W 18.04	Wallow Ck A	0.68	BLM	Natural Unimproved	0.68	0	0	0	OP		
38 S 05 W 19.00	Red Rose Mine	0.66	BLM	Pit Run	0.66	0	0	0	OP		0.35
38 S 05 W 19.01	Powell Wallow Crk	2.16	BLM	Pit Run	2.16	0	0	0	OP		0.3
38 S 05 W 20.00A	Banning Ck Sp	0.57	BLM	Aggregate	0.57	0	0	0	FD	ADM	0.2
38 S 05 W 20.00B	Banning Ck Sp	0.33	BLM	Natural Unimproved	0.33	0	0	0	FD	ADM	1.7
38 S 05 W 20.01	Banning Ck Rd Sp	1.19	BLM	Aggregate	1.19	0	0	0	OP		
38 S 05 W 20.02	China Basin Sp	0.33	BLM	Natural Unimproved	0.33	0	0	0	OP		
38 S 05 W 21.00	Slade Hill Sp A	1.34	BLM	Natural Unimproved	1.34	0	0	0	OP		
38 S 05 W 21.01	Banning Ck Rd Spur	0.1	BLM	Natural Unimproved	0.1	0	0	0	OP		
38 S 05 W 21.02	Banning Ck Sp	0.45	BLM	Natural Unimproved	0.45	0	0	0	OP		0.08
38 S 05 W 29.00A	China Basin Rd	1.46	BLM	Aggregate	1.46	0	0	0	OP		0.03
38 S 05 W 29.00B	China Basin Rd	1.27	BLM	Aggregate	1.27	0	0	0	OP		1.7
38 S 05 W 29.00C	China Basin Rd	0.75	BLM	Aggregate	0.75	0	0	0	OP		
38 S 05 W 29.00D	China Basin Rd	0.78	BLM	Natural Unimproved	0.78	0	0	0	OP		
38 S 05 W 29.01	China Ck A Spur	0.43	BLM	Natural Unimproved	0.43	0	0	0	OP		1.2
38 S 05 W 29.02	China Ck Spur B	0.66	BLM	Natural Unimproved	0.66	0	0	0	OP		0.07
38 S 05 W 29.03	China Basin	1.53	BLM	Pit Run	1.53	0	0	0	OP		
38 S 05 W 30.00	Powell Ck Spur	0.27	BLM	Natural Unimproved	0.27	0	0	0	FD	ADM	
38 S 05 W 31.00	Mungers Mule A Sp	0.63	BLM	Aggregate	0.63	0	0	0	SC	ADM	0.06
38 S 05 W 31.01A	Mungers Mule B Sp	0.8	BLM	Aggregate	0.8	0	0	0	SC	ADM	
38 S 05 W 31.01B	Mungers Mule B Sp	0.76	BLM	Aggregate	0.76	0	0	0	SC	ADM	0.05
38 S 05 W 31.02	Mungers Mule C Sp	0.93	BLM	Pit Run	0.93	0	0	0	SC	ADM	0.2
38 S 05 W 31.03A	Marble Gulch Mine	0.25	BLM	Aggregate	0.25	0	0	0	ST	REC	0.2
38 S 05 W 31.03B	Marble Gulch Mine	0.87	BLM	Natural Unimproved	0.87	0	0	0	ST	REC	0.27
38 S 05 W 31.04	N Marble Gu	0.66	BLM	Aggregate	0.66	0	0	0	SC	ADM	0.05
38 S 05 W 31.05	Marble Gulch	0.14	BLM	Natural Unimproved	0.14	0	0	0	SC	ADM	
38 S 05 W 31.06	Mungers Mule Sp	0.68	BLM	Aggregate	0.68	0	0	0	FD	POC	
38 S 05 W 31.07	Mining Claim Sp	0.22	BLM	Natural Unimproved	0.22	0	0	0	SC	ADM	
38 S 05 W 33.00A1	China Crk	0.56	BLM	Aggregate	0.56	0	0	0	OP		
38 S 05 W 33.00A2	China Crk	0.83	BLM	Aggregate	0.83	0	0	0	OP		0.08
38 S 05 W 33.00B	China Crk	2.5	BLM	Aggregate	2.5	0	0	0	OP		1.2
38 S 06 W 01.00A	Cherry Flat Main	1.25	BLM	Aggregate	1.25	0	0	0	OP		
38 S 06 W 01.00B	Cherry Flat Main	0.52	BLM	Aggregate	0.52	0	0	0	OP		
38 S 06 W 01.00C	Cherry Flat Main	1.1	BLM	Aggregate	1.1	0	0	0	OP		
38 S 06 W 01.00D	Cherry Flat Main	3.22	BLM	Pit Run	3.22	0	0	0	OP		0.05
38 S 06 W 11.00	Murphy Mtn	5.76	BLM	Aggregate	5.76	0	0	0	OP		

RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	Miles of Road within Riparian
38 S 06 W 13.00A	Wallow Crk Spur	0.66	BLM	Aggregate	0.66	0	0	0	OP		
38 S 06 W 13.02	Mungers Ridge Spur	0.75	BLM	Aggregate	0.75	0	0	0	FD	ADM	
38 S 06 W 14.00A	Spencer Crk B Rd	1.7	BLM	Aggregate	1.7	0	0	0	OP		
38 S 06 W 14.00B	Spencer Crk B Rd	0.49	BLM	Aggregate	0.49	0	0	0	OP		
38 S 06 W 14.00C	Spencer Crk B Rd	0.27	BLM	Aggregate	0.27	0	0	0	OP		
38 S 06 W 15.00	Murphy Mtn C Sp	0.88	BLM	Natural Unimproved	0.88	0	0	0	ST	ADM	0.18
38 S 06 W 15.02	Murphy Mtn Jeep	1.85	BLM	Grid Rolled	1.85	0	0	0	SC	ADM	0.6
38 S 06 W 22.00	Murphy Mtn B Sp	0.57	BLM	Grid Rolled	0.57	0	0	0	SC	ADM	0.33
38 S 06 W 22.01	Spencer Ck C Sp	0.17	BLM	Grid Rolled	0.17	0	0	0	ST	ADM	
38 S 06 W 25.00A	Powell Ck Spur D	0.76	BLM	Natural Unimproved	0.76	0	0	0	ST	POC	0.08
38 S 06 W 25.00B	Powell Ck Spur D	0.75	BLM	Natural Unimproved	0.75	0	0	0	SC	POC	0.12
38 S 06 W 25.01	Silvertip Spur	0.9	BLM	Natural Unimproved	0.9	0	0	0	FD	POC	0.46
38 S 06 W 25.02	Silvertip Spur Po	0.65	BLM	Natural Unimproved	0.65	0	0	0	OP		0.12
38 S 06 W 25.03	Powell Ck Spur A	0.28	BLM	Natural Unimproved	0.28	0	0	0	FD	POC	0.2
38 S 06 W 25.04	Silvertip Munger	0.72	BLM	Natural Unimproved	0.72	0	0	0	ST	REC	0.18
38 S 06 W 25.05	Powell Ck Spur	1.02	BLM	Natural Unimproved	1.02	0	0	0	OP		0.18
38 S 06 W 26.00	Powell Ck D Spur	0.52	BLM	Natural Unimproved	0.52	0	0	0	FD	ADM	
38 S 06 W 34.00	Wildeer Jeep Sp	1.77	BLM	Natural Unimproved	1.77	0	0	0	ST	ADM	
38 S 06 W 35.02	C Spur Munger Crk	0.85	BLM	Pit Run	0.85	0	0	0	ST	POC	0.08
38 S 06 W 35.03	Mungers Ck N Spur	0.27	BLM	Natural Unimproved	0.27	0	0	0	SC	POC	0.03
38 S 06 W 35.04A	Mungers Crk N	0.32	BLM	Grid Rolled	0.32	0	0	0	SC	POC	0.08
38 S 06 W 35.04B	Mungers Crk N	0.23	BLM	Grid Rolled	0.23	0	0	0	SC	POC	
38 S 06 W 35.05	Mungers Ck Sp	0.64	BLM	Natural Unimproved	0.64	0	0	0	SC	POC	
38 S 06 W 35.06	Mungler Ck Sp	0.4	BLM	Natural Unimproved	0.4	0	0	0	SC	POC	
38 S 06 W 35.07	Munglers Ck Sp	0.6	BLM	Natural Unimproved	0.6	0	0	0	FD	POC	0.16
38 S 06 W 35.08	Mungers Ck Sp	0.25	BLM	Natural Unimproved	0.25	0	0	0	SC	POC	0.06
38 S 06 W 36.00A	Mungers Crk N	1.33	BLM	Pit Run	1.33	0	0	0	ST	POC	0.52
38 S 06 W 36.00B	Mungers Crk N	1.19	BLM	Pit Run	1.19	0	0	0	SC	POC	0.52
39 S 05 W 05.00A	Marble Gulch	0.47	BLM	Aggregate	0.47	0	0	0	ST	POC	0.15
39 S 05 W 05.00B	Marble Gulch	2.74	BLM	Pit Run	2.74	0	0	0	SC	POC	0.8
39 S 05 W 06.00A	Cedar Flt	0.95	BLM	Bituminous	0.95	0	0	0	OP		
39 S 05 W 06.00B	Cedar Flt	1.79	BLM	Bituminous	1.79	0	0	0	OP		0.34
39 S 05 W 06.00C	Cedar Flt	1.2	BLM	Bituminous	1.2	0	0	0	OP		0.36
39 S 05 W 06.00D	Cedar Flt	2.27	BLM	Bituminous	2.27	0	0	0	OP		0.19
39 S 05 W 06.00E	Cedar Flt	1.55	BLM	Bituminous	1.55	0	0	0	OP		0.35
39 S 05 W 06.00F	Cedar Flt	1.25	BLM	Bituminous	1.25	0	0	0	OP		0.07
39 S 05 W 06.01A	Mungers Crk	0.63	BLM	Bituminous	0.63	0	0	0	OP		
39 S 05 W 06.01B	Mungers Crk	1.16	BLM	Bituminous	1.16	0	0	0	OP		0.18
39 S 05 W 06.01C	Mungers Crk	0.68	BLM	Bituminous	0.68	0	0	0	ST	POC	0.2

RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	Miles of Road within Riparian
39 S 05 W 06.01D	Mungers Crk	0.91	BLM	Pit Run	0.91	0	0	0	SC	POC	0.42
39 S 05 W 06.01E	Mungers Crk	0.06	Private	Pit Run	0.06	0	0	0	SC	POC	
39 S 05 W 06.01F	Mungers Crk	2.07	BLM	Pit Run	2.07	0	0	0	SC	POC	0.36
39 S 05 W 06.02A	Cedar Bill	2.69	BLM	Aggregate	2.69	0	0	0	OP		
39 S 05 W 06.02B	Cedar Bill	0.22	BLM	Aggregate	0.22	0	0	0	OP		
39 S 05 W 07.00A	Lone Crk	1.23	BLM	Aggregate	1.23	0	0	0	OP		
39 S 05 W 07.00B	Lone Crk	0.5	BLM	Aggregate	0.5	0	0	0	OP		
39 S 05 W 07.00C1	Lone Crk	0.81	BLM	Aggregate	0.81	0	0	0	OP		0.1
39 S 05 W 07.00C2	Lone Crk	0.71	BLM	Pit Run	0.71	0	0	0	OP		0.2
39 S 05 W 07.00D	Lone Crk	2.11	BLM	Pit Run	2.11	0	0	0	OP		
39 S 05 W 18.01A	Low Divide	0.5	BLM	Bituminous	0.5	0	0	0	OP		0.04
39 S 05 W 18.01B	Low Divide	2	BLM	Bituminous	2	0	0	0	OP		0.83
39 S 05 W 18.01C	Low Divide	1.1	BLM	Bituminous	1.1	0	0	0	OP		0.5
39 S 05 W 18.01D	Low Divide	0.2	BLM	Bituminous	0.2	0	0	0	OP		0.15
39 S 05 W 18.01E	Low Divide	0.36	BLM	Natural Unimproved	0.36	0	0	0	OP		
39 S 05 W 19.00A	S / M P Line	1.18	BLM	Aggregate	1.18	0	0	0	ST	POC	0.56
39 S 05 W 19.00B	S / M P Line	0.36	Private	Aggregate	0.36	0	0	0	SC	POC	0.05
39 S 05 W 19.00C	S / M P Line	0.25	BLM	Aggregate	0.25	0	0	0	SC	POC	
39 S 05 W 19.02	Lone Ck C Sp	1.74	BLM	Aggregate	1.74	0	0	0	OP		0.53
39 S 05 W 19.03	S / M B Line	0.22	BLM	Aggregate	0.22	0	0	0	DR	POC	0.06
39 S 05 W 19.04	S / M A Line	0.61	BLM	Aggregate	0.61	0	0	0	SC	POC	
39 S 05 W 19.05	S / M C Line	0.42	BLM	Aggregate	0.42	0	0	0	SC	POC	
39 S 05 W 19.06	S / M D Line	0.28	BLM	Aggregate	0.28	0	0	0	SC	POC	
39 S 05 W 31.00A	Little Sugarloaf	0.53	BLM	Aggregate	0.53	0	0	0	OP		
39 S 05 W 31.00B	Little Sugarloaf	0.18	BLM	Natural Unimproved	0.18	0	0	0	ST	MNT	
39 S 05 W 31.01	Little Sugarloaf Sp	0.88	BLM	Aggregate	0.88	0	0	0	OP		
39 S 06 W 01.00	Swamp Creek a	0.81	BLM	Natural Unimproved	0.81	0	0	0	OP		0.1
39 S 06 W 01.02	Swamp Ck A	1.83	BLM	Pit Run	1.83	0	0	0	SC	POC	0.1
39 S 06 W 01.03	Swamp Ck B	1.46	BLM	Pit Run	1.46	0	0	0	OP		0.2
39 S 06 W 01.04	Swamp Ck C	0.3	BLM	Pit Run	0.3	0	0	0	OP		
39 S 06 W 01.05	Cedar Swamp	2.31	BLM	Pit Run	2.31	0	0	0	ST	POC	0.33
39 S 06 W 01.06	Swamp Ck D	0.25	BLM	Pit Run	0.25	0	0	0	OP		
39 S 06 W 01.07	Cedar Flat Sp	0.21	BLM	Natural Unimproved	0.21	0	0	0	OP		
39 S 06 W 01.08	Cedar Swamp Sp	0.37	BLM	Pit Run	0.37	0	0	0	OP		0.09
39 S 06 W 02.00A	Elk B Sp Bear Wall	0.2	Private	Natural Unimproved	0.2	0	0	0	OP		
39 S 06 W 02.00B	Elk B Sp Bear Wall	0.17	Private	Natural Unimproved	0.17	0	0	0	OP		
39 S 06 W 02.00C	Elk B Sp Bear Wall	0.31	BLM	Natural Unimproved	0.31	0	0	0	OP		
39 S 06 W 02.01A	Elk Sp B	0.74	Private	Natural Unimproved	0.74	0	0	0	ST	MNT	

RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	Miles of Road within Riparian
39 S 06 W 02.01B	Elk Sp B	0.45	BLM	Natural Unimproved	0.45	0	0	0	ST	MNT	
39 S 06 W 02.02	Cedar Flat P Spur	0.89	BLM	Natural Unimproved	0.89	0	0	0	OP		0.14
39 S 06 W 03.00	Holcomb Peak	1.72	BLM	Grid Rolled	1.72	0	0	0	SC	ADM	0.1
39 S 06 W 03.02	Paradise Mine	3	BLM	Aggregate	3	0	0	0	OP		0.28
39 S 06 W 03.03	Paradise Mine N	0.66	BLM	Grid Rolled	0.66	0	0	0	OP		0.05
39 S 06 W 09.02	Holcomb Peak Sp	1.33	BLM	Natural Unimproved	1.33	0	0	0	SC	ADM	
39 S 06 W 10.00	Bear Wallow Spur	0.45	BLM	Natural Unimproved	0.45	0	0	0	ST	MNT	0.11
39 S 06 W 11.00A	Bear Wallow	1.38	BLM	Aggregate	1.38	0	0	0	OP		0.5
39 S 06 W 11.00B	Bear Wallow	2.22	BLM	Aggregate	2.22	0	0	0	OP		0.66
39 S 06 W 11.00C	Bear Wallow	0.52	BLM	Aggregate	0.52	0	0	0	OP		0
39 S 06 W 11.00D	Bear Wallow	3.52	BLM	Aggregate	3.52	0	0	0	OP		1.09
39 S 06 W 11.01A1	Cedar Flat Sp	0.31	BLM	Aggregate	0.31	0	0	0	OP		
39 S 06 W 11.01A2	Cedar Flat Sp	0.33	Private	Aggregate	0.33	0	0	0	OP		
39 S 06 W 11.01B	Cedar Flat Sp	0.45	Private	Aggregate	0.45	0	0	0	OP		
39 S 06 W 11.01C	Cedar Flat Sp	0.18	BLM	Aggregate	0.18	0	0	0	OP		0.04
39 S 06 W 11.02	Lower Bear Wallow	0.21	BLM	Natural Unimproved	0.21	0	0	0	OP		0.02
39 S 06 W 11.03	Bear Wallow F Spu	0.16	BLM	Natural Unimproved	0.16	0	0	0	OP		
39 S 06 W 11.04	Bear Wallow Sp	0.19	BLM	Aggregate	0.19	0	0	0	OP		
39 S 06 W 12.00A	Cedar Flat Sp	0.12	BLM	Natural Unimproved	0.12	0	0	0	OP		
39 S 06 W 12.00B	Cedar Flat Sp	0.44	BLM	Natural Unimproved	0.44	0	0	0	OP		
39 S 06 W 12.01	Cedar Flat Sp	0.77	BLM	Aggregate	0.77	0	0	0	OP		
39 S 06 W 12.02	Lower Bear Wallow	2.41	BLM	Aggregate	2.41	0	0	0	OP		0.46
39 S 06 W 12.03	Upper Bear Wallow	1.04	BLM	Aggregate	1.04	0	0	0	OP		
39 S 06 W 12.04	Cedar Flat Sp	0.51	BLM	Aggregate	0.51	0	0	0	OP		
39 S 06 W 12.05	Cedar Wallow Sp	0.23	BLM	Aggregate	0.23	0	0	0	OP		
39 S 06 W 13.00A	Bill Crk	1.25	Private	Natural Unimproved	1.25	0	1.25	0	ST	POC	1
39 S 06 W 13.00B	Bill Crk	0.46	Private	Natural Unimproved	0.46	0	0	0	SC	POC	
39 S 06 W 13.01	Bill Ck Sp	0.4	BLM	Natural Unimproved	0.4	0	0	0	ST	MNT	0.07
39 S 06 W 15.00	Bear Wallow Sp	0.28	BLM	Natural Unimproved	0.28	0	0	0	ST	ADM	
39 S 06 W 23.00	Low Dv W	0.32	BLM	Natural Unimproved	0.32	0	0	0	ST	ADM	
39 S 06 W 23.01	Low Dv W	0.23	BLM	Pit Run	0.23	0	0	0	OP		0.2
39 S 06 W 23.02	Low Divide Sp	1.25	BLM	Pit Run	1.25	0	0	0	OP		
39 S 06 W 23.03	Low Divide Sp	0.3	BLM	Natural Unimproved	0.3	0	0	0	ST	MNT	
39 S 06 W 25.00A	Low Dv E	0.69	BLM	Aggregate	0.69	0	0	0	OP		0.1
39 S 06 W 25.00B	Low Dv E	0.72	BLM	Aggregate	0.72	0	0	0	OP		
39 S 06 W 25.01	Low Dv E	0.73	BLM	Aggregate	0.73	0	0	0	OP		
39 S 06 W 25.03	Low Dv E	0.43	BLM	Aggregate	0.43	0	0	0	OP		
39 S 06 W 36.00A	Little Sugarloaf	0.55	BLM	Bituminous	0.55	0	0	0	OP		0.07

RouteID	RoadName	TotalMiles	Control	SurfaceType	Maint	Const	Renov	Decom	ClosureStat	ClosureRsn	Miles of Road within Riparian
39 S 06 W 36.00B	Little Sugarloaf	0.71	BLM	Aggregate	0.71	0	0	0	OP		0.05
39 S 06 W 36.00C	Little Sugarloaf	0.84	BLM	Aggregate	0.84	0	0	0	OP		0.13
39 S 06 W 36.00D	Little Sugarloaf	0.28	BLM	Aggregate	0.28	0	0	0	OP		0.06
Totals		173.46			173.46	0	4.06	0			32.18

Maintenance may include surface grading, roadside brushing, for safety, spot rocking and maintaining existing drainage structures. Maintenance of natura
surface roads may also include correcting drainage and erosion problems (e.g., improving or installing drainage dips, installing other drainage structures w
needed, eliminating outside road edge berms or other features that are obstructing drainage where they exist).

Full Decommissioning consists of subsoil ripping of the roadbed to promote the establishment of vegetation and promote drainage consistent with the
surrounding undisturbed areas. Existing culverts may be removed. Grass seeding of the road prism, fill slope and cutbank, and mulching of the Road pris
may be included to minimize initial erosion potential prior to natural revegetation. An earth berm/tank trap barricade may be constructed at the beginning o
each road to prevent use of the road prism following decommissioning.

Road Renovation consists of reconditioning and preparing the subgrade for heavy truck use, cleaning and shaping drainage ditches and structures, and
trimming or removing vegetation from cut and fill slopes.

Appendix D. Alternatives and Issues Considered, but Not Analyzed in Detail

Only comments that have not been addressed in the EA are addressed here.

One commenter stated that there is a lack of large hardwoods due to past spraying and shading / competition. The project will thin around hardwoods to the extent possible to enhance oak habitat; however, LSR guidelines limit the canopy reduction that can be accomplished in this project.

Some commenters requested that roads be decommissioned in this project. As roads in the project area are used for fire suppression and other activities, and some are required to provide access to private lands, no roads are proposed for decommissioning. Appropriate renovation is proposed to address erosion problems and road closures would be reinforced or redesigned to restrict unauthorized use.

Appendix E. Wildlife

SPECIAL STATUS SPECIES ASSESSMENT
PROJECT NAME: Deer Willy Landscape Management Plan

Prepared by: Jason Reilly **Date: 6/2/08**

Signature:

On July 26, 2007 a new Special Status Species list went into affect (IM No. OR-2007-072). This new list has two categories, Sensitive and Strategic. The former categories of Bureau Assessment and Bureau Tracking no longer exist. As a result, species were removed from the list and no additional species have been added at this time. The table below provides additional information on special status species known or suspected to occur within the Grants Pass Resource Area, based on the curent USDI Bureau of Land Management OR/WA Special Status Species List. Each of these species was considered and evaluated for this project. The method(s) used to assess and review the potential effects to these species followed the techniques described in the OR/WA Special Status Species Policy (IM OR-2003-054). The following documents the basic conclusions of this assessment by species. A description of the table's headings and letter codes are located at the bottom of the table.

Date:

SPECIAL STATUS SPECIES IN GRANTS PASS RA

SPECIES	STATUS	RANGE (Y/N)	Presence	PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS
Birds – BS & BA				
American peregrine falcon	BS, SE, 2	Y	A	No nesting habitat within the project area, but they could forage within the project area.
Bald eagle	FT, ST, 4	Y	P	No project activities would adversely affect individuals.
Lewis' woodpecker	BS, CR, 2	Y	P	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Northern spotted owl	FT, ST, 1	Y	P	Seasonal Restrictions identified in the PDFs (EA p. 17, 18). would protect known sites from project activity disturbance. Proposed actions will not preclude species from moving between LSRs and physiographic provinces. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts have been addressed in detail in the EA.
Marbled murrelet	FT, ST, 2	N	N/A	N/A
Purple martin	BS, CR, 2	Y	A	No habitat within the project area.
Tricolored Blackbird	BS	Y		
White-headed woodpecker	BS, CR, 2	Y	U	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.

SPECIES	STATUS	RANGE (Y/N)	Presence	PROJECT SPECIFIC COMMENTS/ BASIC CONCLUSIONS
White-tailed kite	BS, 2		A	No habitat within the project area.
Amphibian – BS & BA				
Black salamander	BS, P, 2	Y	U	Coarse woody debris would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Foothill yellow-legged Frog	BS, V, 2	Y	P	Culvert installation, road decommissioning, and road renovation may have negative short term impacts on foothill yellow-legged frog habitat. However, sediment delivery to streams due to project activities at all three sites would be highly localized, immeasurable, and of short duration and PDFs would minimize potential impacts from sedimentation (EA p. 17, 18).
Siskiyou Mt. salamander	BS, V, 2	N	N/A	Project is outside of range. No known sites.
Reptiles – BS & BA				
Northwestern pond turtle	BS, CR, 2	Y	S	Suspected within the watershed at large water sources, but not expected to occur in project units.
Mammals – BS & BA				
Fisher	FC, CR, 2	Y	S	Temporary human disturbance, both temporally and spatially would be inconsequential. Adequate levels of snags and coarse woody debris would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Fringed myotis	BS, V, 2	Y	S	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Pallid bat	BS, V, 2	Y	U	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Townsend's big-eared bat	BS, CR, 2	Y	S	Mine adits will be protected with 250' no harvest buffers. Seasonal restrictions will further protect maternity and/or hibernating colonies from disturbance.
Invertebrates – BS & BA				
Cooley's Acalypta lace bug	STR, 1	N	N/A	N/A
Coronis fritillary butterfly	STR, 1	N	N/A	N/A
Franklin's bumblebee	STR	U (Jackson County Only)	N/A	N/A
Gray-blue butterfly	STR	U	U	
Mardon skipper butterfly	FC, 2	N	N/A	N/A
Oregon shoulderband snail	BS, 1	Y	U	Coarse woody debris would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.
Siskiyou short-horned grasshopper	BS, 1	Y	A	No habitat present in the project area.
Travelling sideband snail	BS, 1	Y	U	Coarse woody debris would be retained (EA p. 17, 18),adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to the species and/or habitat at the watershed scale.

Table Headings and Letter Code Definitions

Species: are listed by taxon. Bureau Sensitive and Bureau Assessment are combined, and then Bureau Tracking is listed.
Status: lists the Oregon BLM, Oregon state and then Oregon Natural Heritage Program codes in that order.

Oregon BLM Codes:

FE - USFW Endangered - in danger of extinction throughout a significant portion of its range
FT - USFW Threatened - likely to become endangered species within the foreseeable future
FC - USFW Candidate - proposed and being reviewed for listing as threatened or endangered
SM - Survey & Manage - Forest plan ROD directs protection of known sites and/or survey for new sites
BS - Bureau Sensitive (BLM) - eligible for addition to Federal Notice of Review, and known in advance of official publication. Generally these species are restricted in range and have natural or human caused threats to their survival.
STR - Bureau Strategic Species (BLM) - not presently eligible for official federal or state status, but of concern which may at a minimum need protection or mitigation in BLM activities.

Oregon State Codes:

SE - State Endangered - in danger of extinction in the state of Oregon
ST - State Threatened - listed as likely to become endangered by the state of Oregon
CR - State Critical - listing is pending, or appropriate, if immediate conservation action not taken
V - State Vulnerable - listing not imminent, and can be avoided through continued or expanded use of adequate protective measures and monitoring
P - State Peripheral or naturally rare - populations at the edge of their geographic range, or historically low numbers due to limiting factors
U - State Unknown - status unclear, insufficient information to document decline or vulnerability

ONHP Codes:

1 - Oregon Natural Heritage Rank, threatened with extinction throughout its range
2 - Oregon Natural Heritage Rank, threatened with extinction in the state of Oregon
3 - Oregon Natural Heritage Rank, more information is needed before status can be determined, but may be threatened or endangered in Oregon or throughout range
4 - Oregon Natural Heritage Rank, of conservation concern. May be rare, but are currently secure. May be declining in numbers or habitat but still too common to be considered as threatened or endangered. May need monitoring.

Range: indicates yes or no, if the breeding range overlaps with the Grants Pass Resource Area. If not within the range, both presence and basic conclusion on not applicable (N/A). For invertebrates in which there is inadequate data to determine ranges, 'U' is used for unknown.

Presence: indicates 'P' if a species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and/or no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.

Basic Conclusion: describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

PROJECT NAME: Deer Willy Landscape Management Project
2004 MIGRATORY BIRD SPECIES ASSESSMENT

Prepared by: Jason Reilly **Date: 6/2/08**

Signature: **Date:**

The following contains a list of Northern Pacific Forest Bird Conservation Region migratory birds that occur within the Grants Pass Resource Area (USFWS, 2002). Each of these species was considered and evaluated for this project. The following documents the basic conclusions of this assessment by species, and complies with the Migratory Bird Treaty Act and Executive Order 13186 to protect migratory birds. Two key principles of these are 1) focus on bird populations and their habitats rather than on individuals, and 2) focus conservation efforts on USFWS Birds of Conservation Concern.

SPECIES[1]	PRESENCE[2]	BASIC CONCLUSION[3]
Lewis's woodpecker	P	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to individuals and/or habitat at the watershed scale.
Olive-sided flycatcher	P	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to individuals and/or habitat at the watershed scale.
Rufous hummingbird	S	Untreated areas would be left. Ground disturbance from treatment activities and prescribed fire will stimulate growth of shrubs and herbaceous plants. Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to individuals and/or habitat at the watershed scale.
Peregrine falcon	A	No nesting habitat within the project area.
Flammulated owl	U	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to individuals and/or habitat at the watershed scale.
White-headed woodpecker	U	Adequate levels of snags would be retained (EA p. 17, 18). Adequate potential habitat exists within and adjacent to the project area. Proposed activities impacts are inconsequential to individuals and/or habitat at the watershed scale.

[1] USFWS Birds of Conservation Concern 2002 that breed within the Grants Pass Resource Area.
[2] Indicates 'P' if the species is known to occur in the project area, 'S' suspected to occur based on known sites adjacent to the project area, or suitable breeding habitat exists, 'U' uncertain that the species occurs within the project area based on insufficient data, 'A' absent from the project area based on no known sites and no suitable breeding habitat within the project area, and 'T' possibly transitory species utilizing habitats within the project area during migration.
[3] Describes the facts, context and intensity to provide the rationale for the conclusion of the proposed action(s) on the species and its habitat.

Summary of Habitat Relationships and Biological Objectives

Focal Species[1]	Conservation Focus[3]	Key Habitat Relationships			
		Vegetative Composition	Vegetation Structure	Landscape/ Patch Size	Special Considerations
Lewis's woodpecker[2]	large snags large conifer trees	Cottonwood Herbaceous, shrubs, ponderosa pine	>0.8 snags/acre >16 in dbh; >0.8 trees/acre >21 dbh; canopy cover 10-40%; shrub cover 30-80% trees >20 dbh; 2.5 snags/ha >12 dbh; tree canopy cover 10-40%		dependent on insect food supply; competition from starlings detrimental pine-oak sites may be most suitable
Olive-sided[2] Flycatcher	Early seral, mature and old growth forest edges with snags	Mt. & Western Hemlock; Noble & Silver fir	Retain >3 2.5 acre areas with 4-12 trees/acre >40 ft. tall; rest avg. 1-2 trees/acre >40 ft. tall		Harvest units >50 acres; retain understory hemlocks & true firs, & large snags
Rufous Hummingbird[2]	Early seral habitats; Nectar producing plants	Salmonberry, currant, penstemon, paintbrush	Diverse vegetative structure		Open space for aerial courtship display
Peregrine Falcon	Cliffs		Diverse vegetative structure		
Flammulated Owl	Large snags	Ponderosa pine and Jeffery pine; mixed conifer	Large diameter snags (min 12 dbh); mature forests; open canopy		Dependent on large primary cavity excavators (Pileated's, flicker's & sapsuckers)
White-headed woodpecker	Mix of mature cone producing pine species	Ponderosa Pine mix	50-70% canopy closure, >21" dbh snags & stumps for nesting cavities; >10 trees/acre >21" dbh		

[1] USFWS. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, VA. 99pp. Only those that breed within the Grants Pass RA.
[2] Habitat specifications from Partner's in Flight Conservation Plans for Western Coniferous Forests, Westside Lowlands and Valleys and the Columbia Plateau.
[3] Habitat requirements of focal species highly associated with important attributes or conditions within each habitat type (PIF Westside Lowlands and Valleys and the Columbia Plateau, p. 3).

Spotted Owl Habitat McKelvey Rating System

Spotted owl habitat within the project area was evaluated based on the McKelvey model. Operations Inventory polygons were given an owl habitat suitability rating from 1 to 6 using aerial photo interpretation, ground truthing and roadside reconnaissance.

The McKelvey Rating System is based on a model that predicts spotted owl population based on habitat availability. Stands were examined for criteria such as canopy layering, canopy closure, snags, woody material and other features. Biological potential of a stand to acquire desired conditions is also taken in consideration. The McKelvey Rating System uses the following six classes:

The McKelvey Classification System is described below:

Class 1 - Meets all life requirements (optimal). Nesting, foraging, roosting and dispersal. Canopy closure greater than 60 percent with overstory trees greater than 21" in diameter. Canopy structure usually multi-layered and diverse and includes snags, mixed species and large wolf trees. Large down wood present on the forest floor.

Class 2 - Meets foraging, dispersal, and roosting. Canopy closure greater than 60 percent and overstory trees are generally greater than 16" in diameter. Open enough below canopy to permit flight. Canopies can be single layered. Class 1 & 2 together are considered suitable owl habitat nesting, roosting and foraging (NRF).

Class 3 - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting, or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to some kind of disturbance but has the biological potential to develop into class 1 or 2. This class includes clearcuts, plantations, thinned timber that could grow into suitable habitat given enough time.

Class 4 - Meets no known requirements for spotted owls. Does not provide nesting, foraging, roosting or dispersal. Canopy closure 40 percent or less. Does not meet requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include oak woodlands, serpentine areas, etc.. Other examples include roads, rockpits, brush fields, non forest, or very low stocking. To enable quantification and display of dispersal habitat, Class 5 was created as a subset of Class 3, and Class 6 was created as a subset of Class 4. These stands feature scattered clumps of cover that could offer short-term roosting cover to owls as they disperse across the landscape.

Class 5 - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Has the biological potential to develop into nesting, foraging or roosting habitat.

Class 6 - Provides for spotted owl dispersal habitat only. Canopy closure between 40 and 60 percent. Needs to be open enough below canopy to allow for flight and avoidance of predators. Not currently meeting nesting, roosting or foraging requirements due to site limitations and would not likely have the potential to develop into class 1 or 2. Examples could include low site lands, woodlands, serpentine areas, etc.

Appendix F. References and Literature Cited

Amaranthus, Michael P and David E. Steinfeld, September, 1997. *Soil compaction after Yarding of Small-Diameter Douglas Fir with a Small Tractor in Southwest Oregon.* Pacific Northwest Research Station, USDA-Forest Service. PNW-RP-504.

Beschta, R.L., M.R. Pyles, A.E. Skaugset, and C.G. Surfleet. 2000. *Peakflow responses to forest practices in the western Cascades of Oregon, USA.* Journal of Hydrology 233:102-120.

Best, D.W.; Kelsey, H.M.; Hagans, D.K.; Alpert, M. 1995. *Role of fluvial hillslope erosion and road construction in the sediment budget of Garrett Creek, Humboldt County, California.* In: Nolan, K.M.; Kelsey, H.M.; Marron, D.C., eds. Geomorphic processes and aquatic habitat in the Redwood Creek Basin, northwestern California. Professional Paper 1454. Washington, DC: U.S. Geological Survey; M1-M9.

Marshall, K. and D. Goheen. 2003. Monitoring effectiveness of roadside sanitation treatments to decrease likelihood of spread of *Phytophthora lateralis* in Southwest Oregon (unpublished report). Initial findings present at the Western International Forest Disease Work Conference (WIFDWC), 2003. USDA Forest Service, Southwest Oregon Forest Insects and Disease Center, Central Point, Oregon.

Gucinski, Hermann; Furniss, Michael J.; Ziemer, Robert R.; Brookes, Martha H. 2001. *Forest Roads: A Synthesis of Scientific Information.* Gen. Tech. Rep. PNWGTR- 509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Luce, C. H., Black, T. A., 2001, *Spatial and Temporal Patterns in Erosion from Forest Roads*. In: Wigmosta, M. W. and Burges, S. J., editors, Influence of Urban and Forest Land Uses on the Hydrologic-Geomorphic Responses of Watersheds. American Geophysical Union, Washington, DC.

Megahan, W.F, 1974. *Erosion Over Time on Severely Disturbed Granitic Soils: A Model.* Research Paper INT-156, United States Department of Agriculture, Forest Service, Ogden, Utah, 14 pp.

Moore, R.D. and S.M. Wondzell. 2005. *Physical hydrology and the effects of forest harvesting in the Pacific Northwest: a review.* Journal of the American Water Resources Association, pp. 763-784, August 2005

Neary, Daniel G., Carole C. Klopatek, Leonard F. DeBano and Peter F. Ffolliott, 1999. *Fire effects on belowground sustainability: a review and synthesis.* Forest Ecology and Management, Vol 122 (1-2) pg 51-71.

Oregon Dept of Environmental Quality, 1999. TMDL Assessment Report: Riparian Shade, Williams Creek.

Rashin, Edward, B., Casey J. Clishe, Andrew T. Loch, and Johanna M. Bell, 2006. *Effectiveness of Timber Harvest Practices for Controlling Sediment Related Water Quality Impacts.* JAWRA 42:1307-1327.

Rothacher, J. 1971. *Regimes of streamflow and their modification by logging*. In: Proceedings of a symposium: forest land uses and stream environment, J. T. Krygier and J. D. Hall (Editors). October 19-21, 1970 Oregon State University, Corvallis, Oregon. Forest Extension, Oregon State University, Corvallis, Oregon, pp. 40-54.

Scott, D. F. and D. B. Van Wyk, December 1990, *The effects of wildfire on soil wettability and hydrological behaviour of an afforested catchment.* Journal of Hydrology, Volume 121, Issues 1-4, 15 Pages 239-256

Stednick, J.D., 1996. *Monitoring the effects of timber harvest on annual water yield.* Journal of Hydrology 176: 79-95

Swanston, D.N., 1974 *Slope stability problems associated with timber harvesting in mountainous regions of the western United States.* USDA Gen. Tech. Report. PNW-21. Portland, OR, USA.

Switalski, TA, JA Bissonette, TH DeLuca, CH Luce, and MA Madej, 2004. *Benefits and impacts of road removal.* Frontiers in Ecology and the Environment 2(1): 21-28.

USDI, BLM. Record of Decision for Density Management and Conversion Treatments and Attaining Riparian Reserve Function: Management Direction Concerning Silvicultural Activities Inside the Riparian Reserves. Coos Bay Dist. Office, North Bend, OR

USDI, BLM. 1996. Williams Creek Watershed Analysis. Medford District BLM, Grants Pass Resource Area.

Wemple, B. C., F. J. Swanson, J. A. Jones. 2001. *Forest roads and geomorphic process interactions, CascadeRange, Oregon*. Earth Surf. Process Landforms 26, pp. 191-204. John Wiley & Sons, Ltd. 2001.

Watershed Professionals Network (WPN). 1999. *Oregon Watershed Assessment Manual*. June 1999. Prepared for the Governor's Watershed Enhancement Board, Salem Oregon.

A.C. Kendig and Co. and Cedarock Consultants, Inc. 2003. *Best Available Science Literature Review and Stream Buffer recommendations*. City of Renton. Project No. 182. Renton, WA. http://www.ci.renton.wa.us/ednsp/images/caostrea.pdf

Ziemer, Robert R. 1981. *Storm flow response to road building and partial cutting in small streams of northern California.* Water Resources Research 17: 907-917.

Alexander, John. 2005. Personal Communication. Executive Director, Klamath Bird Observatory. Ashland, Oregon.

Aubry, K.B. and J.C. Lewis. 2003. Extirpation and reintroduction of fishers (*Martes pennanti*) in Oregon: implications for their conservation in the Pacific states. Biological Conservation 114 (1):79-90.

Buermeyer K.R., and C.A. Harrington. 2002. Fate of Overstory Trees and Patterns of Regeneration 12 Years After Clearcutting with Reserve Trees in Southwest Washington. *Western Journal of Applied Forestry* 17 (8): 78-85.

Carey, A.B., J.A. Reid, and S.P. Horton. 1990. Spotted owl home range and habitat use in southern Oregon coast ranges. *Journal of Wildlife Management* 54:11-17.

Chappell, C. B. and Kagan J. 2001. Southwest Oregon mixed conifer-hardwood forest, in Wildlife-Habitat Relationships in Oregon and Washington. Johnson, D. H. and O'Neil, Thomas A., eds. Oregon State University Press, Corvallis, Oregon.

Courtney, S.P., J A Blakesley, R E Bigley, M L Cody, J P Dumbacher, R C Fleischer, A B Franklin, J F Franklin, R J Gutiérrez, J M Marzluff, L Sztukowski. 2004. Scientific evaluation of the status of the Northern Spotted Owl. Sustainable Ecosystems Institute. Portland, OR.

Douglas, C.W. and M.A. Strickland. 1987. Fisher. *In* Wild furbearer management and conservation in North America. M. Novak, J.A. Baker, M.E. Obbard, Eds. Toronto, Ontario: Ontario Ministry of Natural Resources. Pp. 511-529.

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Biology and Management of the northern spotted owl in Oregon. *Wildlife Monographs* No. 87: 1-64.

Forsman, E.D., R.G. Anthony, E.C. Meslow, and C.J. Zabel. 2004. Diets and Foraging Behavior of Northern Spotted Owls in Oregon. *J. of Raptor Res*. 38(3):214-230.

Hagar, Joan and Shay Howlin. 2001. Songbird Community Response to Thinning of Young Douglas-fir Stands in the Oregon Cascades - Third Year Post-treatment Results for the Willamette National Forest, Young Stand Thinning and Diversity Study. Department of Forest Science, OSU.

Harris, J. E., and C. V. Ogan. Eds. Mesocarnivores of Northern California: Biology, Management and Survey Techniques, Workshop Manual. August 12-15, 1997. Humboldt State University. Arcata, CA. The Wildlife Society, California North Coast Chapter. Arcata, Ca. 127 p.

Janes, Stewart W. 2003. Bird Populations on the Panther Gap Timber Sale, 1994-2003: Short and Long term Response to Commercial Thinning. Technical Report submitted to Medford BLM.

Mellen, Kim, Bruce G. Marcot, Janet L. Ohmann, Karen Waddell, Susan A. Livingston, Elizabeth A. Willhite, Bruce B. Hostetler, Catherine Ogden, and Tina Dreisbach. 2006. DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon. Version 2.0. USDA Forest Service, Pacific Northwest Region and Pacific Northwest Research Station; USDI Fish and Wildlife Service, Oregon State Office; Portland, Oregon. http://wwwnotes.fs.fed.us:81/pnw/DecAID/DecAID.nsf

Powell, R.A. 1993. The Fisher: Life History, Ecology and Behavior. 2nd ed. Minneapolis, MN. University of Minnesota Press. 237 p.

Powell, R. A. and Zielinski, W. J. 1994. Fisher. In The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine: 38-73. Fort Collins, Colorado, USA: USDA Forest Service, Rocky Mountain Forest and Range Experimental Station.

Sakai, H.F., and B.R. Noon. 1993. Dusky-footed woodrat abundance in different-aged forests in northwestern California. *Journal of Wildlife Management* 57(2):373-382.

Sakai, H.F., and B.R. Noon. 1997. Between-Habitat Movement of Dusky-Footed Woodrats and Vulnerability to Predation. *Journal of Wildlife Management* 61(2):343-3350.

Sauer, J.R., J.E. Hines, and J. Fallon. 2004. The North American Breeding Bird Survey, Results and Analysis 1966-2003. Version 2004.1. USGS Patuxent Wildlife Center Laurel, Maryland.

Sherwin, R. 1998. Townsend's Big-eared bat. *In* Western Bat Working Group, Bat Species Accounts. Available online at: http://www.wbwg.org/

Siegel R.B, and D.F. DeSante. 2003. Bird Communities in Thinned Versus Unthinned Sierran Mixed Conifer Stands. *The Wilson Bulletin*: Vol. 115, No. 2 pp. 155–165.

Solis, D.M. and R.J. Gutierrez. 1990. Summer habitat ecology of northern spotted owls in Northwest California. *Condor* 92:739-748.

USDA, Forest Service and USDI, Bureau of Land Management. Interagency Special Status/Sensitive Species Program (ISSSP) website. www.fs.fed.us/r6/sfpnw/isssp/planning-tools/

USDA, Forest Service, and USDI Bureau of Land Management. 1994a. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl and Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl. Government Printing Office.

USDA, Forest Service and USDI, Bureau of Land Management. 1994b. Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old Growth Forest Related Species Within the Range of the Northern Spotted Owl. Appendix J2 Results of Additional Species Analysis. Portland, Oregon.

USDA, Forest Service and USDI, Bureau of Land Management. 1995. Southwest Oregon Late-successional Reserve Assessment.

USDI Fish and Wildlife Service. 2002. Birds of Conservation Concern 2002. Division of Migratory Bird Management, Arlington, VA. http://migratory birds.fw.gov/reports/bcc2002.pdf

USDI Fish and Wildlife Service. 2003. Rogue River/South Coast Biological Assessment FY04-08 for Activities that may affect listed species in the Rogue River/South Coast Province of Medford District, Bureau of Land Management, Rogue River and Siskiyou National Forests, Biological Opinion FWS Ref. #1-15-03-F-511.

USDI Fish and Wildlife Service. 2003. Washington, DC. Federal Register. February 6, 2003 Vol. 68 (25) 6179.

USDI Fish and Wildlife Service. 2003. Washington, DC. Federal Register. July 10, 2003 Vol. 68 (132) 41169-41174.

USDI, US Fish and Wildlife Service. 2004. Washington, DC. Federal Register April 8, 2004 Vol. 69 (68) 18769-18792.

USDI Fish and Wildlife Service. 2006. Rogue River/South Coast Biological Assessment FY06-08 for Activities that may affect listed species in the Rogue River/South Coast Province of Medford District, Bureau of Land Management, Rogue River and Siskiyou National Forests, Biological Opinion FWS Ref. #1-15-06-F-0162.

USDI Fish and Wildlife Service. 2006. Washington, DC. Federal Register. Sept 12, 2006 Vol. 71 (176) 53777.

USDI Fish and Wildlife Service. 2007. Washington, DC. Federal Register. July 9, 2007 Vol. 72 (130) 37346 -37372.

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD*

Vargus, Mark. 2006. Personal Communication. Wildlife Biologist, Oregon Department of Fish and Wildlife. Rogue Watershed District Office, 1495 E. Gregory Road. Central Point, OR 97502.

Verts, B. J., and L. N. Carraway. 1998. Land Mammals of Oregon. University of California Press. Berkeley, CA.

Wender, B.W., C.A. Harrington, J.C. Tappeiner. 2004. Flower and fruit production of understory shrubs in western Washington and Oregon. *Northwest Science* 78(2): 124-140.

Zielinski, W. J., R. L. Truex, G.A. Schmidt, F.V. Schlexer, K. N. Schmidt, and R.H. Barrett. 2004. Home Range Characteristics of Fishers in California. *Journal of Mammalogy*. 85(4): 649-657.

Atzet, Thomas; Wheeler, David L. 1982. Historical and ecological perspectives on fire activity in the Klamath Geological Province of the Rogue River and Siskiyou National Forests. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.

Graham R.T. et. al. 2004, Science Basis for changing Forest Structure to Modify Wildfire Behavior and Severity. General Technical Report RMRS-GTR-120, Rocky Mountain Research Station.

Pullen, R. 1995. Overview of the environment of native inhabitants of southwestern Oregon. Late rehistoric era. Pullen Consulting, Bandon, OR. USDA Forest Service, Siskiyou National Forest. Unpublished Report.

Van Wagner, C.E. 1968. Fire behavior mechanisms in a red pine plantation; field and laboratory evidence. Department of Forestry and Rural Development, Canada. Publication No. 1229. 30 pp.

Pollet, J. and P. N. Omi. 2002. Effect of thinning and prescribed burning on wildfire severity in ponderosa pine forests. International Journal of Wildland Fire 11: 1-10.

Omi, P. N. and E. Martinson. 2002. Effect of fuels treatment on wildfire severity. Final report submitted to the Joint Fire Science Program Governing Board, March 25, 2002.

Thomas, T. L. and Agee, J., 1986. Prescribed fire effects on mixed conifer forest structure at Crater Lake, Oregon. Doi;10.1139/cjfr-16-5-1082

Moore, E.B., 1955. Wildfire Damage Reduced on Prescribed-Burned Areas in New Jersey. Journal of Forestry; 47:378-382

Appendix G. Water Quality Assessment 2004/2006 (ODEQ)

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Illinois 17100311 18220	S Fork Deer Cr 1234515422647 0 to 6.3	pH	Fall/Winter/ Spring	pH 6.5 to 8.5	Resident fish and aquatic life Water contact recreation	Cat 3: Insufficient data	2004 Added to database	2004 Data: [SWCD Illinois Valley] LASAR 26610 River Mile 0.4: From 10/1/1998 to 10/1/1998, 0 out of 1 sample (0%) outside pH criteria range 6.5-8.5.
Illinois 17100311 18221	S Fork Deer Cr 1234515422647 0 to 6.3	pH	Summer	pH 6.5 to 8.5	Resident fish and aquatic life Water contact recreation	Cat 2: Attaining some criteria/uses	2004 Added to database	2004 Data: [SWCD Illinois Valley] LASAR 26610 River Mile 0.4: From 6/25/1998 to 9/15/1998, 0 out of 11 samples (0%) outside pH criteria range 6.5-8.5.
Illinois 17100311 8127	S Fork Deer Cr 1234515422647 0 to 2.2	Temperature	October 1 – May 31	Spawning: 12.8° C	Salmonid fish spawning	Criteria change or use clarification	2004 Delisted - Revised criteria or uses met	
Illinois 17100311 13491	S Fork Deer Cr 1234515422647 2.2 to 4.7	Temperature	October 15 – June 15	Salmon/steelhead spawning: 13.0° C 7-day avg. max.	Salmon and steelhead spawning	Cat 2: Attaining some criteria/uses	2004 Added to database	2004 Data: [BLM - Grants Pass] LASAR 26544 River Mile 4.1: From 10/15/1999 to 10/15/1999, 0 days with 7-day-average maximum >13° C.
Illinois 17100311 13490	S Fork Deer Cr 1234515422647 0 to 2.2	Temperature	October 15 – May 15	Salmon and steelhead spawning: 13.0 13.0° C 7- day avg max	Salmon and steelhead spawning	Cat 2: Attaining some criteria/uses	2004 Added to database	2004 Data: [BLM - Grants Pass] LASAR 26543 River Mile 2.1: From 10/15/1999 to 10/15/1999, 0 days with 7-day day avg max >13° C. [BLM - Grants Pass] LASAR 26542 River Mile 0.6: From 10/15/1999 to 10/15/1999, 0 days with 7-day-average maximum >13° C.

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Illinois 17100311 4041	S Fork Deer Cr 1234515422647 0 to 2.2	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Criteria change or use clarification	2004 Delisted - Revised criteria or uses met	
Illinois 17100311 13136	S Fork Deer Cr 1234515422647 0 to 2.2	Temperature	All Year (Non-spawning)	Salmon and trout rearing and migration: 18.0 13.0° C 7-day day avg max	Salmon and trout rearing and migration	Cat 2: Attaining some criteria/uses	2004 Added to database	2004 Data: [BLM - Grants Pass] LASAR 26542 River Mile 0.6: From 7/6/1999 to 9/25/2000, 0 days with 7-day-average maximum >18° C. [BLM - Grants Pass] LASAR 26543 River Mile 2.1: From 7/6/1999 to 10/14/1999, 0 days with 7-day- day avg max >18° C.
Illinois 17100311 13137	S Fork Deer Cr 1234515422647 2.2 to 6.3	Temperature	All year (Non-spawning)	Core cold water habitat: 16.0° C 7-day day avg max	Core cold water habitat	Cat 2: Attaining some criteria/uses	2004 Added to database	2004 Data: [DEQ] LASAR 24356 River Mile 5.1: From 7/2/2000 to 8/19/2000, 0 days with 7-day day avg max >16° C. [BLM - Grants Pass] LASAR 26544 River Mile 4.1: From 7/6/1999 to 9/25/2000, 0 days with 7-day day avg max >16° C.
Applegate 17100309 4137	E Fork Williams Cr 1232742422112 0 to 2.4	Aquatic Weeds Or Algae	Undefined	Fungi or other growths that have a harmful effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry may not be allowed.	Aesthetics Fishing Water contact recreation	Insufficient data	1998 Added to database	Previous Data:

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Applegate 17100309 4120	E Fork Williams Cr 1232742422112 0 to 2.4	Dissolved Oxygen	Summer	Cold water: Not less than 8.0 mg/l or 90% of saturation	Anadromous fish passage Salmonid fish rearing	303(d)	2002 Added to database	Previous Data: LASAR 28365: 3/9 samples. Applegate Watershed Council,
Applegate 17100309 4183	E Fork Williams Cr 1232742422112 0 to 2.4	Flow Modification	Undefined	Tastes or odors or other conditions that are harmful to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed.	Resident fish and aquatic life Salmonid fish rearing Salmonid fish spawning	Water quality limited not needing a TMDL	2002 Delisted - Water quality limited, not a pollutant	Previous Data:
Applegate 17100309 4287	E Fork Williams Cr 1232742422112 0 to 2.4	Sedimentation	Undefined	The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits harmful to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.	Resident fish and aquatic life Salmonid fish rearing Salmonid fish spawning	Insufficient data	1998 Added to database	Previous Data:
Applegate 17100309 4000	E Fork Williams Cr 1232742422112 0 to 2.4	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Attaining	1998 Added to database	Previous Data: BLM Data (Site above Glade Fork): 7 day moving average of daily maximums of 62.9 with 2 days exceeding temperature standard (64) in 1994.

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Applegate 17100309 4001	Williams Creek 1232401422976 0 to 7.1	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Cat 4A: Water quality limited, TMDL approved	2004 Delisted - TMDL approved	TMDL Approved: 2/11/2004
Applegate 17100309 17809	W Fork Williams Cr 1232742422111 0 to 8.1	Alkalinity	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 samples < 20 mg/L (Table 20 criterion).
Applegate 17100309 17810	W Fork Williams Cr 1232742422111 0 to 8.1	Ammonia	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 samples > applicable Table 20 criterion.
Applegate 17100309 17811	W Fork Williams Cr 1232742422111 0 to 8.1	Chloride	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 samples > applicable Table 20 criterion.
Applegate 17100309 8005	W Fork Williams Cr 1232742422111 0 to 3	Dissolved Oxygen	Summer	Cold water: Not less than 8.0 mg/l or 90% of saturation	Anadromous fish passage Salmonid fish spawning	303(d)	2002 Added to database	Previous Data: Applegate watershed council data LASAR 28380 RM 0.0: 2/10 samples
Applegate 17100309 12198	W Fork Williams Cr 1232742422111 0 to 8.1	Dissolved Oxygen	All year (Non-spawning)	Cold water: Not less than 8.0 mg/l or 90% of saturation	Cold-water aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 sample (0%) <8 mg/l and applicable % saturation.
Applegate 17100309 4185	W Fork Williams Cr 1232742422111	Flow Modification	Undefined	The creation of tastes or odors or toxic or other	Resident fish and aquatic life	Water quality limited not needing a	2002 Delisted - Water quality	Previous Data:

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
	0 to 8.1			conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish may not be allowed.	Salmonid fish rearing Salmonid fish spawning	TMDL	limited, not a pollutant	
Applegate 17100309 17812	W Fork Williams Cr 1232742422111 0 to 8.1	pH	Summer	pH 6.5-8.5	Resident fish and aquatic life Water contact recreation	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 sample (0%) outside pH criteria range 6.5-8.5.
Applegate 17100309 21606	W Fork Williams Cr 1232742422111 0 to 8.1	Phosphate Phosphorus	Summer	Total phosphates as phosphorus (P): Benchmark 50 ug/L in streams to control excessive aquatic growths	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 26843 River Mile 4.7: From 9/23/2002 to 9/23/2002, 0 out of 1 samples >50 ug/L benchmark criterion.
Applegate 17100309 4289	W Fork Williams Cr 1232742422111 0 to 8.1	Sedimentation	Undefined	The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry may not be allowed.	Resident fish and aquatic life Salmonid fish rearing Salmonid fish spawning	Insufficient data	1998 Added to database	Previous Data:

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Applegate 17100309 4002	W Fork Williams Cr 1232742422111 0 to 8.1	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Attaining	1998 Added to database	Previous Data: BLM Data (Site 39S-5W-19): 7 day moving average of daily maximums of 61.4 with 0 days exceeding temperature standard (64) in 1994.
Applegate 17100309 17640	Powell Creek 1232494422723 0 to 7.6	Alkalinity	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 sample <20 mg/L (Table 20 criterion).
Applegate 17100309 17641	Powell Creek 1232494422723 0 to 7.6	Ammonia	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 sample > applicable Table 20 criterion.
Applegate 17100309 17642	Powell Creek 1232494422723 0 to 7.6	Chloride	All year	Table 20 Toxic Substances	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 samples > applicable Table 20 criterion.
Applegate 17100309 12186	Powell Creek 1232494422723 0 to 7.6	Dissolved Oxygen	All year (Non-spawning)	Cold water: Not less than 8.0 mg/l or 90% of saturation	Cold-water aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 sample (0%) <8 mg/l and applicable % saturation.
Applegate 17100309 17643	Powell Creek 1232494422723 0 to 7.6	pH	Summer	pH 6.5- 8.5	Resident fish and aquatic life Water contact recreation	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 sample (0%) outside pH criteria range 6.5- 8.5.

Name HUC4 ID	Name LLID River Mile	Parameter	Season	Criteria	Beneficial Uses	Status	Assessment: Year Action	[Data Source] Supporting Data
Applegate 17100309 21596	Powell Creek 1232494422723 0 to 7.6	Phosphate Phosphorus	Summer	Total phosphates as phosphorus (P): Benchmark 50 ug/L in streams to control excessive aquatic growths	Aquatic life	Cat 3: Insufficient data	2004 Added to database	2004 Data: [DEQ] LASAR 13209 River Mile 6.4: From 7/21/1998 to 7/21/1998, 0 out of 1 sample >50 ug/L benchmark criterion.
Applegate 17100309 8126	Powell Creek 1232494422723 0 to 2	Temperature	October 1 - May 31	Spawning: 12.8° C	Salmonid fish spawning	Cat 4A: Water quality limited, TMDL approved	2004 Delisted - TMDL approved	TMDL Approved: 2/11/2004
Applegate 17100309 3989	Powell Creek 1232494422723 0 to 2	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Cat 4A: Water quality limited, TMDL approved	2004 Delisted - TMDL approved	TMDL Approved: 2/11/2004
Applegate 17100309 3976	Bill Creek 1233464421803 0 to 3.1	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Attaining	1998 Added to database	Previous Data: BLM Data (Site 39S-6W-13): 7 day moving average of daily maximums of 61.4 with 0 days exceeding temperature standard (64) in 1994.
Applegate 17100309 3991	Rock Creek 1232625421793 0 to 4.6	Temperature	Summer	Rearing: 17.8° C	Anadromous fish passage Salmonid fish rearing	Attaining	1998 Added to database	Previous Data: BLM Data (Site 39S-5W-15): 7 day moving average of daily maximums of 61.6 with 0 days exceeding temperature standard (64) in 1994.